COAL AGE

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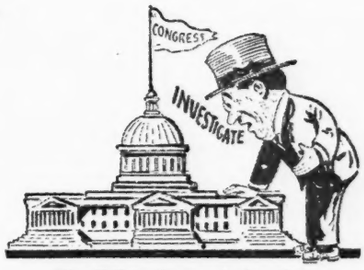
While Congress Investigates

By Rufus T. Strohm

Written expressly for Coal Age

When the rising cost of victuals and of clothing soars so high
That it dislocates the planets from their orbits in the sky,
And you watch with growing nervousness the ebbing of your means
Till you haven't got a nickel left to jingle in your jeans,
That's the psychologic moment, and you have no time to waste,
So you sit you down instanter and you write a note in haste,
Giving Congress all the details of unreasonable rates;
Then you sit and starve while Congress—
Investigates!



They Yell for Congress to Investigate

When the hoary king of winter grips the earth with frosty hand,
Sending apprehensive shivers running up and down the land,
And the people who have dawdled through the summer's pleasant heat
Unexpectedly are threatened with a case of frozen feet,
Then with one accord they clamor for their winter's coal supply,
While they greet the rising prices with a cold, suspicious eye;
But the reason for the increase never filters through their pates,
And they yell until old Congress—
Investigates!

Just Ignore All Explanation

When the railroads fail to furnish cars enough to move your coal,
And the shortage keeps increasing till it racks and rends your soul!
Jump at once to this conclusion, that they want to make you crawl,
And they've all combined to crimp you and to drive you to the wall.
Just forget that Europe's conflict, drenching foreign lands with gore,
Puts our traffic under burdens that it never felt before;
Just ignore this explanation, lay the blame to business hate,
And complain till you make Congress—
Investigate!

There's a new investigation started every other week,
Aimed to settle on the locus of a diplomatic leak
Or discover why the army isn't fed on chicken pie
Or to fix the social status of the plain, domestic fly;
And it loiters and meanders till its weary course is run,
But we're never any wiser when the probing all is done,
For it only yields us volumes full of speeches and debates;
Yet we're satisfied when Congress—
Investigates!

Ideas and Suggestions

Paradoxes of Management

Every business is a great deal like an individual. It is full of inconsistencies and paradoxes. In management, the two greatest factors are thinking, or planning, and doing. Every manager knows that his job is only half begun when he has thought out his plan and given orders for its execution. It is always more than 50 per cent. of the job to get it done.

It was—and still is—a much harder job to carry the message to Garcia than to write it.

Here are a few paradoxes in management that are drawn to the attention of *Coal Age* readers in the hope that some of them, at least, will be eliminated.

Some businesses are full of departments that are little more than blind alleys from which there is no promotion of real importance and no outlook. Men grow grayheaded working in the same groove in which they started. The mine clerk, unless he is almost a wonder, will stay on the clerical side of the business. He will not be considered for filling a salesman's place, even though he may be a born salesman. It is absurd, but nevertheless true of many concerns, that a great deal of its talent and brain power goes to waste because it is misplaced. It seems to be no one's business to discover the round pegs in the square holes and readjust them.

Inconsistent Economies—This is a paradox familiar to us all. Would you, Mr. Manager, issue orders to one department to save and bale all waste paper while you let another burn it? No, you wouldn't. But it is not an unusual thing to see one mine operation allowed all sorts of latitude in the purchase of supplies while another under the same management is kept under a tight rein. The reason may lie in the personality of the superintendent or manager. The man at one mine may be a "favorite at court"; the other isn't. I once saw a boss write a letter to a certain department instructing that the middle section of envelopes be saved and used for scratch paper. In the next moment he approved an expense account that was heavily padded.

Personal Favoritism—The least said about this, the better. Every self-respecting management should abhor this paradox of good business. It has crippled and ruined the ambitions of so many good men. It is something in every management that should not be countenanced. Play no favorites. Let merit count, and give every man his chance.

Taking and Not Giving—It is still a paradox of some managements that they take, but do not give. This phase of management is passing. It is a gratifying thing that one of the outstanding features of the coal business is that so many companies—big and little—are giving their employees so much in the way of decent houses, proper treatment, community needs and all that goes to make life better. But not all are doing this. Some are still taking rather than giving. These must learn that their business will fail unless it is humanized. The manager, superintendent or boss who is giving no loyalty to his men will command very little from them. Also, if those in authority are not able to transmit that human touch, the cost-sheet will reflect it. There is going to be no grand *élan* or *esprit de corps* where the dominating influence is actuated by an arterial circulation of ice water. The boss that the men swear by is hard to beat when it comes to a showdown of costs.

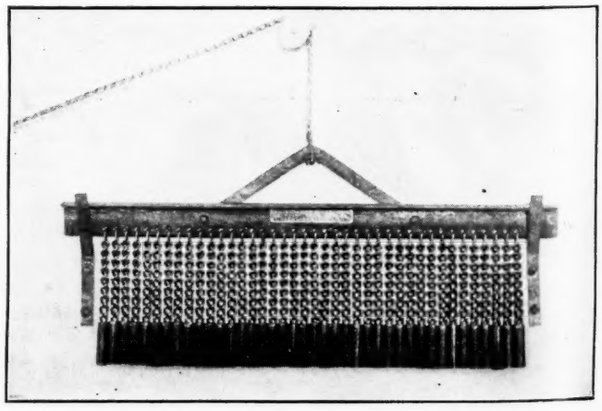
To take and not to give is the vice of a pirate, and no piratical business is going to live long nowadays.

Applying Efficiency—It seems to be a paradox of most managements to believe that efficiency is to be applied to the workers, but never to the managers. These forget that the flow of influence in any organization is from the top down. For principles of efficiency to be effective they should be applied initially to the heads of the concern. If they get it, passing it down the line won't be so hard. There are lots of concerns today that are paying no attention to leaks and losses that in ordinary times would have the whole management busy for days.

Paradoxes of Management—The list is too long. Mining men especially will think of many other forms. It may be the lack of a suggestion system through which your company may avail itself of the brains of all its workers. Whatever suggests itself as paradoxical in your company or your work, Mr. Reader, tackle the job—Cut out the paradox.

Chain Screen Door

The accompanying illustration from the *American Machinist* of Dec. 14, 1916, shows an improved form of chain screen door for oven and furnace openings. This door was designed to eliminate the discomfort of the heat and gases coming out through the uncovered opening, when the doors are thrown open, and the loss of efficiency through the chilling effect of the inrushing cold air. At the same time the form of chain door shown permits an unhampered view of the interior, as the glare is toned down. The doors are made automatic and nonautomatic.



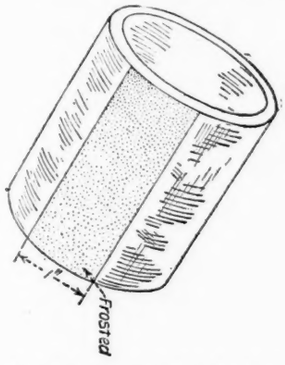
CHAIN SCREEN DOOR FOR BOILER FURNACES

The automatic is employed mostly in boiler furnaces where the opening of the ordinary fire-door causes the screen to unroll from a cylinder hung above the furnace opening. The nonautomatic, which is for use on ovens and other furnaces, is much simpler in construction. The chains forming the screen are suspended from a bar and may be raised out of the way by a hand chain running through a pulley overhead. When needed, the screen is lowered into supporting brackets.

Frosted Globe for Sighting

By H. Clyde Elkins*

The following suggestion is of particular interest for engineers who use safety lamps for surveying in mines. The glass, or globe, is put on an emery stone and "frosted," the polish being taken off, leaving a frosted appearance. This is much better than using paper or tracing cloth as a background in taking sights to a plumb bob in front of a safety lamp. I have used this device and think it far and away superior to all other means yet tried where surveying is done by safety lamp.



War vs. Industrial Accidents

Poets tell us that wars inspire the zealot and the lout alike to deeds of heroism, and as long as they do that they will continue. To them "the fear of war is worse than war itself."

In November, 1906, Dr. Josiah Strong made this statement: "The total number of casualties suffered by our industrial army in one year is equal to the average annual casualties of our Civil War plus those of the Philippine War plus those of the Russian-Japanese War."

Dr. Strong could have gone farther and said that many of these casualties were accompanied by deeds of heroism, but Dr. Strong is not a poet.

If all the unselfishness that comes to the surface when nations are at war could be coaxed out into the open during times of peace, there need be no wars; at least that is the inference the poets suggest.

If the same amount of solicitude that is manifested by the friends of the unfortunates who have come to grief in our industrial armies could be made available to the men who are working for accident prevention, there would be but few casualties. That is what Dr. Strong tried to impress upon us by his figures, and they should be more impressive today than they were in 1906, since war has come close to our doors and has set us all to thinking.

The present war must come to an end soon because of the terrible sacrifice in lives, if for no other reason. Likewise a halt will be called to the slaughter in our industrial army when the loss of life becomes so noticeable that all must understand just what it means.

It almost seems at times as if the men who are devoting their lives to the safety-first movement are crying in the wilderness, as are also the peace advocates who are battling against the world war.

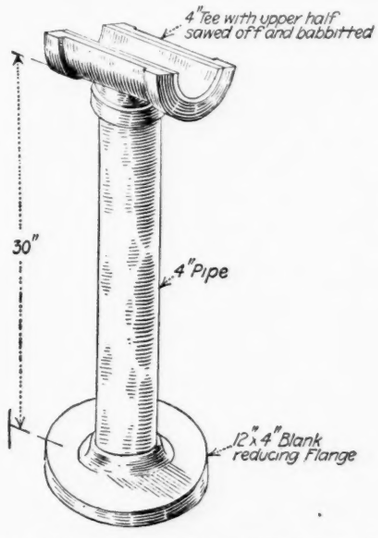
One poet, however, has given us a different picture of war: "The feast of vultures and the waste of life." His word picture is worth learning by heart.

Homemade Armature Stand

By C. J. Fuetter*

It is a common thing to see armatures lying about where they are liable to be damaged—on the floor, in the motor barn, or even in the blacksmith shop. Sometimes they are placed upon wooden horses, but the trouble with these supports is that they are often required for other purposes; the result is that when they are needed they cannot be found and the armatures are placed on the floor.

Having had this experience, I decided to build an armature stand that would answer one purpose only—to hold armatures. Most of the material needed I found in the scrap pile. The accompanying illustration shows the stand as it was finally evolved. I used a 12-in. blind flange, which I bored and threaded in the lathe to take a 4-in. pipe. This pipe was about 30-in. long and threaded on both ends. It was screwed into the flange, forming an upright. A 4-in. tee, with the upper half sawed off and babbitted so as to form a bearing for the armature shaft to rest in, was then screwed onto the upper end of this pipe, which completed the device.



A CHEAP AND PRACTICAL ARMATURE STAND

Two such stands will hold any size of armature and will invariably be on the job when needed, since they cannot well be used for any other purpose.

Use of Powdered Fuel in Brazilian Locomotives—Brazilian coal has been pulverized and used in locomotives. The run-of-mine had an analysis showing 7.9 per cent. moisture, 28.0 per cent. volatile matter, 34.7 per cent. fixed carbon and 29.33 per cent. ash. The coal was ground exceedingly fine, 99.8 per cent. of the coal passing through a 100-mesh sieve and 96.6 per cent. through a 200-mesh sieve. The fuel only contained 8,820 B.t.u. per lb., yet it was used with success in regular service.—International Railway Fuel Association.

*Star Junction, Penn.

*Van Lear, Ky.

Coal Stripping with an Electric Shovel

By Wilbur G. Burroughs*

SYNOPSIS—As much as 60 ft. of overburden is stripped from 6 ft. of Pittsburgh coal by an electric shovel with a 90-ft. boom and a 6-cu.yd. dipper. After being stripped the coal is dug by a small electric shovel.

At the property of the Piney Fork Coal Co., ¼ mi. north of Smithfield Station and about 10 mi. southwest from Steubenville, Jefferson County, Ohio., an electric revolving shovel is being used for stripping the overburden and a smaller electric shovel for loading the coal.

The region is broken considerably by stream erosion that has left hills 200 to 500 ft. high above the valleys. The slopes are moderately steep and the hilltops are gently rounded. Near the summits lies the Pittsburgh coal seam, which is 5 to 6 ft. thick and approximately horizontal, although there are some minor folds. Since the valleys are all comparatively narrow, the quantity of coal lost by erosion is small. The Pittsburgh coal is overlain by thin-bedded shale in which occurs a 3- to 4-ft. bed of limestone about 37 ft. above the coal. Next above this limestone comes a thin bed of coal, then shale covered by clay.

The stripping, loading and crushing of the coal at the Piney Fork Coal Co.'s mine, as well as the lighting, pumping, etc., are performed electrically. The current is brought 2 mi. from a main high-tension line of an electric company in Wheeling, W. Va. From 65,000 volts the current is reduced for use in the various motors of the shovels, the crusher and for lighting, pumping, etc.

The stripping is done with a Marion electric revolving shovel, model 271. The track for this machine is of 120-lb. rails. It is laid on the surface of the coal 6 to 8 ft. from the face. To this shovel is sent an electric current of 4400 volts, which operates the individual motors used for propelling the shovel, hoisting, revolving, etc. All the electrical equipment connected with the stripping shovel was made by the General Electric Co.

Operating Details

The actual length of the boom is 90 ft., while the base is 10 ft. above the coal. At present overburden up to 50 ft. in thickness is being removed, but as may readily be seen, a much greater depth can be stripped if desired. The dipper has a capacity of 6 cu.yd. of material. The shovel makes three scoops in two minutes—that is, one scoop every 40 sec. Electric lights are placed on the boom and at various other points on the shovel, so that work may continue all night. Two 9-hr. shifts are worked each day on the stripping.

Some of the advantages of the electric shovel for stripping, over a steam-operated machine, are stated by W. R. Dorsey, superintendent of the Piney Fork Coal Co.'s mine, to be as follows: An electric shovel can be operated

*New Rochelle, N. Y.

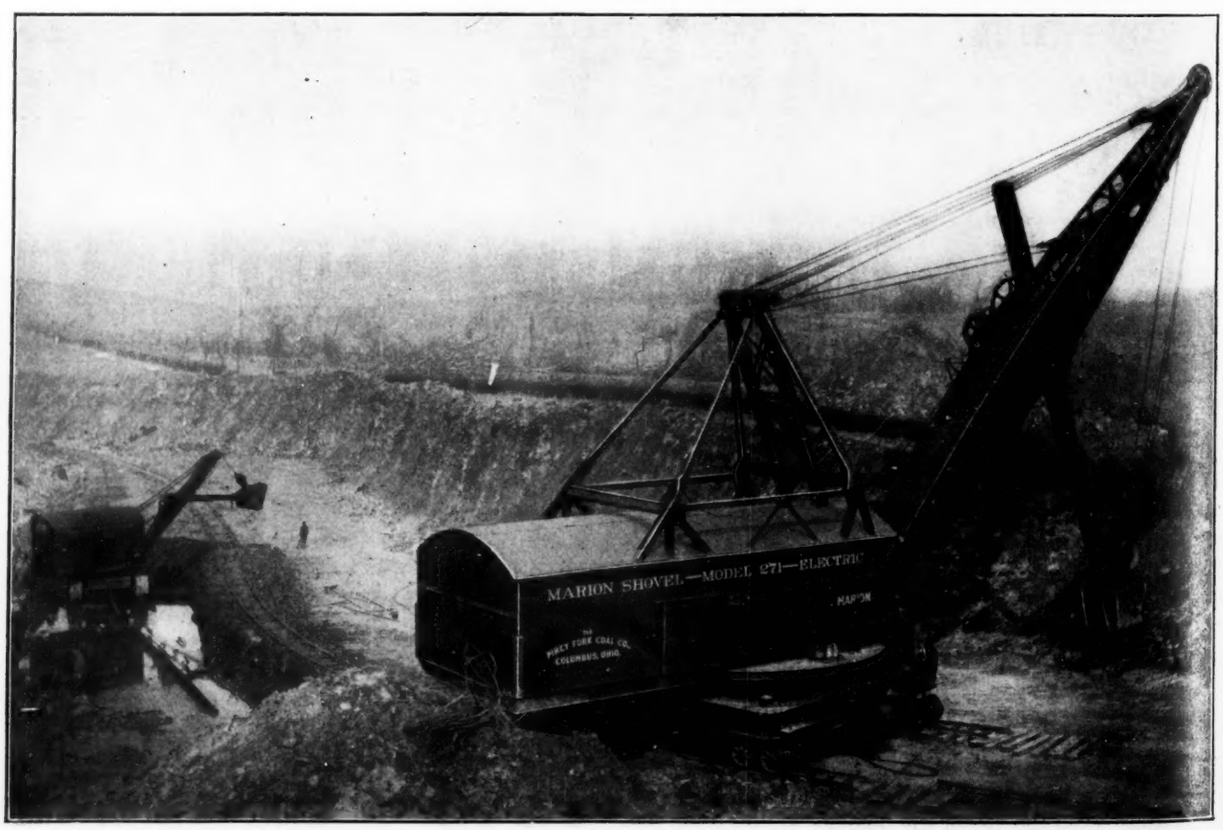


FIG. 1. THE FULL-REVOLVING ELECTRIC SHOVEL IN THE STRIP PIT; THE CABLE REEL MAY BE PLAINLY SEEN AT THE END OF THE SHOVEL PLATFORM

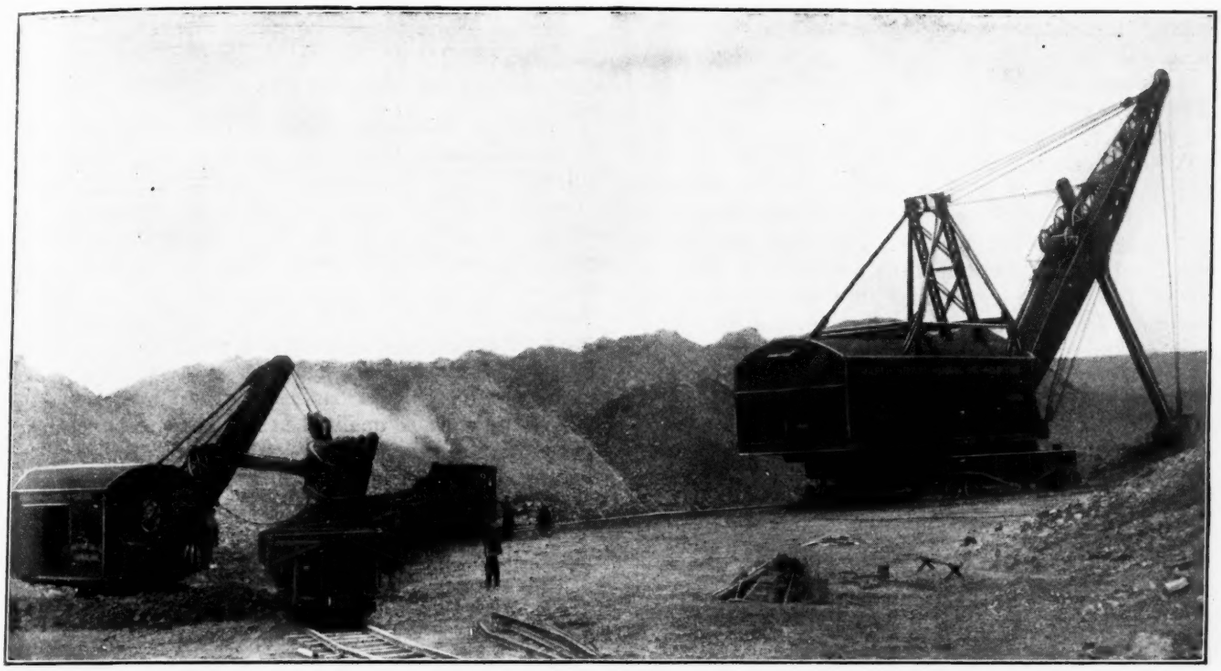


FIG. 2. TWO ELECTRIC SHOVELS, ONE STRIPPING, THE OTHER LOADING THE COAL

with at least two men less than it takes to operate a steam shovel; there is no coal to haul and burn in the operation of such a machine and no water to freeze; the actual operating expense of the electric shovel is less than that of the steam shovel. All these items in favor of the electric machine overbalance extra initial cost over that of the steam shovel.

Stripping Was Started at Outcrop

At the Piney Fork Coal Co.'s property stripping was started where the Pittsburgh coal outcropped on the side of the hill. At first the overburden was dumped down the hillside, thus doing away with rehandling and making certain that in settling it would not run back and cover any of the coal. As the work progressed and the shovel ate its way back and forth in the hilltop, the overburden was, and continues to be, thrown onto the place whence the coal has been taken. Occasionally it is advisable to loosen the overburden by blasting. Holes are drilled by a "Clipper Blast Hole Drill," manufactured by the Loomis Machine Co., of Tiffin, Ohio. Dynamite is used, the charge being set off electrically.

The surface of the land as left by the stripping shovel has the appearance of a mountainous region in miniature. Heaps and ridges of dumped rock stand 50 to 80 ft. high, and between these are narrow, valley-like depressions and hollows. This overburden, if thrown over in wet weather, may have a tendency to slip, but if dumped in dry weather it stands well. If dropped in dry weather, but afterward wet by the rain, it may slip somewhat. This, however, is not likely, for the rock and clay in falling from the dipper are packed into a mass whose own weight still further consolidates it. Thus little trouble is experienced from the heaps of dumped overburden sliding back onto the exposed coal.

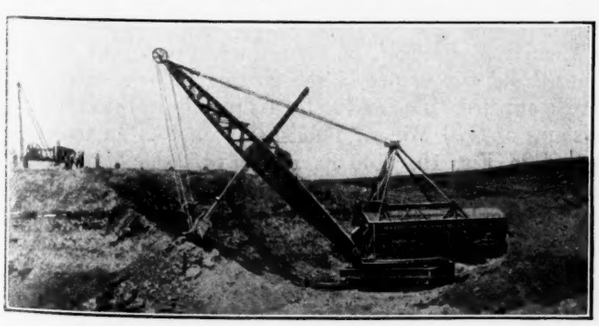


FIG. 3. ELECTRIC SHOVEL WITH BLASTHOLE DRILL IN THE BACKGROUND

The bottom of the pit dug by the stripping shovel is a solid bed of Pittsburgh coal 5 to 6 ft. thick. This coal is not shot, being lifted directly by a Marion No. 36 electric revolving loading shovel with a dipper capacity of 1½ tons of coal. A 1500-volt electric current passes to this shovel. All the electrical equipment installed in this loading shovel also was made by the General Electric Co. The loading shovel operates 8 hr. per day.

Draining the Pit

To drain the pit is an easy matter, since the mine is so high up on the hillside that water collects only after a heavy rain. At such a time a ditch cut in the bottom of the pit readily draws off the water to some lower place in the pit, or out onto the hillside. If this cannot be done, an electric centrifugal pump is provided which quickly disposes of the water. A second electric pump is used to supply water to the haulage engines, the spring from which this water is obtained yielding an ample amount, even during the driest weather.

A haulage track of 60-lb. rails is laid on top of the solid coal between the face and the track for the stripping shovel. Two dinkey steam engines each handle a trip of 15 cars, the average load per car being three tons of coal. The car boxes are 8x9 ft. in horizontal dimensions, so that the spillage of coal when loading from the shovel is greatly reduced from what it would be on a narrower type of car. On the west side of the hill the

coal is dumped from these haulage cars, which are side dumping, into a bin placed on the hillside below the haulage-car tracks. From this bin the coal is delivered to a crusher, or sold directly as run-of-mine.

The tracks at the point where the cars are dumped are arranged to facilitate dumping. The inner rail of the track, along which the loaded cars approach the bin where they are dumped, is gradually elevated relative to the outer rail or the one nearer the bin. Thus the track directly opposite the bin is slanting toward it. From this point on, the track over which the empty cars pass has the relative elevation of its rails reversed from what they were before reaching the bin, the inner rail becoming lower than the outer for a short distance, both

FIG. 4. CROWDING MOTOR ON THE BOOM

rails later being brought to the same elevation. By this arrangement of the relative elevations of the rails the trip-rider dumps the coal from the cars as they tilt toward the bin. On passing this point, however, the boxes fall back into place automatically, owing to the reversed relative elevation of the rails of the track.

Most of the Coal Is Crushed

From the bin the coal is passed into a Jeffrey single roll crusher driven by a 50-hp. motor made by the Wagner Electric Manufacturing Co., of St. Louis. The crushed coal is carried by a Jeffrey chain conveyor down the hillside to a spur of the Wabash R.R., which runs to the mine from Smithfield Station, ¼ mi. away. When desired, the coal is not passed through the crusher but is sent directly to the conveyor and sold as run-of-mine. Most of the coal, however, is crushed and sold as nut, pea and slack. It is shipped over the Wabash R.R. to supply Lake, mill and railroad trade.

For permission to visit the mine and for aid in the preparation of this article, I am indebted to J. W. Blower, president of the Piney Fork Coal Co., the main offices of which are at Columbus, Ohio. For information given and courtesy shown at the mine, I wish to thank W. R. Dorsey, mine superintendent.

Bureau Secures Further Information on Coal Quality in 1916

By Van H. Manning*

In order to obtain adequate and comparable information on the value of the fuel resources of the country, the United States and the various State Geological Surveys, in coöperation with the Bureau of Mines, have been collecting mine samples of coal from various parts of the country for a number of years. From time to time these analyses have been collected and tabulated in geographical order for publication in bulletins. These publications form a library of ready reference to which busy operating engineers or purchasing agents of railroads, steamships and large industrial concerns may turn and determine in advance the probable quality of coal in any given locality.

The first of this series of publications, Bulletin 22, contains all analyses of mine and car samples of coal collected between July 1, 1904, and June 30, 1910. The second, Bulletin 85, contains the analyses made between July 1, 1910, and June 30, 1913. The third bulletin covering the period between July 1, 1913, and June 30, 1915, is now being published.

Analyses of the coals of Kentucky was continued in coöperation with the Kentucky State Geological Survey, and similar studies were made of the coals of Maryland in coöperation with the Maryland Geological Survey.

Short Coal Supply in Michigan

In many of the smaller cities of Michigan an extreme shortage of coal is reported. Coal on hand in several cities like Grand Rapids, Pontiac, Port Huron and St. Clair has on occasions only been sufficient to last 24 hr., and railroads have had to make special efforts to move shipments. Urgent telegraph orders have frequently been placed by Michigan dealers with Illinois and Indiana operators for rush shipments at premium prices.

Efforts are being made by the Michigan Railroad Commission to have some of the coal that is held in Toledo and at points south moved to Michigan points. The Pere Marquette R.R. has been obliged to suspend train movements in a number of instances because of lack of coal, and just recently it made arrangements with the Consolidated Coal Co., of Saginaw, to secure all the free coal mined at the properties of that company.

A number of the Michigan automobile plants are very short of steam coal, and conditions are so serious that the state legislature is considering a resolution for investigating the situation.

Errata

Thomas J. Crocker, of Johnstown, Penn., has kindly pointed out two errors in the writing of legends in the article entitled "Line and Return Troubles in the Haulage Systems of Coal Mines," published Jan. 27. In the sublegend to Fig. 10, "100 lb. per sq.yd." should read, of course, "100 lb. per yd." The sublegend to the figure following should read, "Thus a 24-in. bond (see A) of 4/0 capacity (see B) has a resistance to 100 amp. of current of 0.010 ohms and of 0.040 ohms to a current of 400 amp."

*Director, United States Bureau of Mines, Washington, D. C.

Coöperation, Conservation and Competition in the Coal Industry*

By E. W. Parker†

SYNOPSIS—There should be coöperation between producers, between producers and distributors, between distributors, and between employers and employees. The coal industry in the past has been frequently the subject of vicious attacks both from the yellow journals and from governmental officials. Coöperation in the bituminous fields has proved beneficial to both producer and consumer. Competition should be rivalry in service.

I have selected for the title of this address "Coöperation, Conservation and Competition in Coal." Whatever criticism may be made of the text which follows, my title has the merit, at least, of being alliterative.

In the process of transferring coal from the depths of the earth to the consumer there are four opportunities for the development of a higher order of coöperation than we have yet attained, and which when effectively put into practice will go far toward securing the elimination of unnecessary waste.

The opportunities for coöperation are: (1) Among producers, (2) between producers and distributors, (3) among distributors and (4) between employers and employees. It is not my purpose to attempt to work out the details of these nor of the subheads of the second division of my caption—conservation—but to state them briefly in the hope that subsequent discussion may eventually lead to tangible results.

Baiting Anthracite Operator a Solemn Trust

In any discussion of the coal industry one must, as I do, approach the subject of coöperation among producers hesitatingly. This is particularly true in regard to the anthracite branch of the industry, for heretofore to suggest that any two or three of those who operate coal mines should "assemble and meet together" for the discussion of any plan of coöperation has been to start anew the claims of the yellow press that the operators were planning some coup for mulcting the public. Nor have the attacks upon the anthracite industry been confined to certain types of journalists. There are Government officials, both legislative and executive, state and Federal, who for reasons best known to themselves, try to persuade themselves that their duty to the public and their oath of office require action of some kind against the anthracite operators.

It is encouraging to note that there is at last established under the Federal Government at Washington a tribunal whose words and deeds so far have shown that it realizes not only the desirability but the necessity for a higher degree of coöperation among the producers of coal, to the end that some stability may be given to the industry. We may hope before long to see coal mining given as fair a chance to exist under the Federal Trade Commission as railroading receives under the Interstate Commerce Commission.

Aside from the effects produced by the European War, the beneficent influences of the new order of things is already apparent in the bituminous regions, and the operators of the Pittsburgh vein and the Hocking districts in Ohio, the operators in this State of Illinois, in West Virginia and elsewhere, are coöperating with the sanction of the Federal Trade Commission in the exchange of information through their associations with benefit to the trade and without injury to the public. There is even in the anthracite region of Pennsylvania an Anthracite Coal Operators' Association, composed of the individual operators, who make weekly reports to their secretary as to condition of trade, labor and car supply, etc., and receive a weekly bulletin giving a résumé of these statements.

It is reasonable to believe the time is not far distant when coal operators may and will coöperate in an exchange of information relating to trade conditions, car and labor supply, etc., so that production may be regulated somewhat in accordance with demand, even as now the California fruit growers regulate their shipments with entire satisfaction to the consumers, thus stabilizing the industry, from the growers' standpoint, in a way that was not dreamed of 20 years ago.

But if there is need for coöperation among producers there is even greater need for it between the producers on one hand and the retailers or distributors on the other. As I stated in an address before the New York Coal Merchants' Association a few weeks ago, the producing end of the coal business is its foundation and the retailing end is the superstructure. It is necessary that one should square with the other if the house is to stand. Mine operators are not so familiar as they should be with the problems that face and harass the retailer, and the retailer cannot know or begin to appreciate the larger problems that confront the operator.

Dealers Do Not Know the Cost of Delivery

All of you have probably heard retail dealers express the opinion that coal operators generally and particularly the anthracite operators, are animated only by self-interest; that they control the supply of a commodity the public must have, and as the retailer had to take the complaints of the public, they, the operators, were entirely indifferent as to the quality of the product they turned out, or as to how and when the public got it.

But in this regard, too, there appears to be a tendency in the right direction. Last spring, just prior to the conference on the wage agreement, the anthracite operators took the public into their confidence through some large advertising displays in the columns of the daily press. One of these gave some figures showing what items entered into the price of the ton of coal for which the consumer paid. It was an illuminating statement, and one of the things it did was to bring out some indignant protests from retailers, especially in Philadelphia. The result was, however, that there were several conferences held between some of the representative dealers and some of the officers of the operating companies, from which it developed that many of the dealers actually did not

*Address before the American Mining Congress, Chicago, Ill., Nov. 15, 1916.

†Director Anthracite Bureau of Information, Wilkes-Barre, Penn.

know what the first cost of the coal was to them, what it cost them to handle and deliver it, and how much, if any, profit they were making. The conferences gave them something to think about and indicate that more of the same thing would be rather advantageous than otherwise to both sides.

The operators realize this, and as a step in that direction have requested the Bureau of Information to keep in touch with the retailers as much as possible by having its director attend the meetings of their associations and take part in their discussions. The desire of the operators has been and is for a closer coöperation and better understanding between the producers and the retailers. "'Tis a consummation devoutly to be wished," if a higher degree of efficiency and economy in the distribution of coal to the consumers is to be accomplished.

There is no phase of industry in which there is greater need of coöperation than among the retailers in any specialty—coal among the rest.

It has been said that it costs more to deliver a quart of milk in the city of New York than it does to get it from the cow to the city. What can be more illustrative of useless expense than half a dozen or a dozen milk wagons from as many different establishments delivering milk in one city block? Delivery of coal is not exactly akin to delivery of milk, for one coal cart cannot deliver 50 or 100 tons of coal as a milk wagon delivers that many quarts of milk, but there is just the same or more waste of energy in the retailing of coal than in its mining, preparation, or transportation, or possibly all of them put together.

Hauling Coal Past Competitor's Coal Yard

Why should a coal dealer whose yard is in one part of a city deliver coal to a consumer two or three miles distant when another dealer could reach the same consumer by a haul of as many blocks? The coal merchants themselves are beginning to realize this, as is evinced by the discussions which constitute the larger part of the proceedings in their conventions. There is a disposition to get together and talk over matters affecting the economies of their business, to discuss candidly the problems that confront them, and to try by coöperative methods to improve their service to their patrons and incidentally to attempt to achieve a better return on their investment of capital, labor and brain.

The securing of a higher degree of coöperation between employer and employees, or between capital and labor, is perhaps a matter more difficult of accomplishment, but we can afford to be optimistic.

At the present time the periods between the wage agreements smack somewhat of armed truces, with the terms of the truce not always strictly adhered to, and with apprehension of open conflict at the termination of the agreement. But, unsatisfactory as conditions may be as we have them now, I believe they are better than they were 15 or 20 or 25 years ago, and that they are going to improve still further. And one of the best methods of securing this species of coöperation is to compel the honest fulfilment of an agreement once it is signed and not to permit an evasion on the part of either side because of a temporary situation that makes the evasion easier or more profitable than its enforcement. The heads of labor organizations today are more than vituperative over the Danbury hatters' case, but because of that case they are, no matter what they say, more respectful of the law and of the men who compelled its observance. If both sides contend honestly and strenuously for the strict observance of their agreements, each will have a higher respect for the other and be more willing to work in coöperation rather than in antagonism.

The "conservation" part of this paper might well be divided into three parts—conservation of life, conservation of resources and conservation of capital. Of these, of course, the first is by far the most important. We all know that coal mining is one of the most hazardous of occupations in which men engage, the Gloucester fisheries, railroad train service, and the steel mills being the only industries in which the loss of life bears a higher percentage to the number employed than does coal mining. But in these four it is to the one with the lowest percentage that credit must be extended for doing most to promote the welfare of the employees and to reduce the hazard of their employment. The birth of first aid was in the anthracite region of Pennsylvania and came about through the observance by the present president of the Philadelphia & Reading Coal and Iron Co., W. J. Richards, of an accident in which the injured man lost his life because there was no help at hand to stop the flow of blood.

One Company Alone Has 70 First-Aid Teams

That was some 15 years ago. Last September the 12th annual field day and first-aid contests of the Philadelphia & Reading Coal and Iron Co., at which over 70 teams entered the competition, was held. It was not long before other companies began to follow the example of the Reading, and now most of the companies have their trained crews to render first aid, and their annual contests are a feature in the late summer and early fall months in the anthracite region.

Nor is this matter of saving life and relieving suffering now a monopoly of the anthracite region. It has spread all over the bituminous coal-mining districts, and even the railroads and the steel mills have been organizing and training first-aid corps. So efficient have these men become in the application of first aid that the chief surgeon of one of the hospitals in the anthracite region has stated that many of the cases brought in, which had received first-aid treatment, required no further attention until it was necessary to remove the bandages to dress the wounds.

Conservation of life in the anthracite region is not confined to taking care of the injured and to the installation of "Safety First" signs and accident-preventing devices and rules. It is also applied to looking after the health and well-being of the employees generally. It would interest anyone to take a trip through the region and observe the changes that have taken place in the living and sanitary conditions of the anthracite mine workers. Villages that are not only model in name, but in fact, have sprung up in the last few years; and there seems to have developed a sort of competition among the companies as to which can show the best results in the matter of housing its employees. One of the latest projects of this kind is the building of some 300 houses by one company (150 blocks of two houses each) which are not only attractive in design but are equipped with hot-air furnaces, heating every room in the house, electric lights, shower bath and toilet floored with concrete, laundry, hot and cold water—in fact, all modern con-

veniences and as sanitary as human ingenuity can provide. All of these improvements are not made as an investment in real estate, but as an investment in men; for the companies judge, and wisely, that through these they will secure a better type of workman and that it will lead eventually to that much-desired end—a spirit of coöperation among their employees.

In a paper presented some years ago before the American Institute of Mining Engineers, I hazarded the suggestion that the highest degree of conservation yet attained in the exploitation of our natural resources was typified in the anthracite region, and that opinion still holds. Less than a quarter of a century ago it was estimated that the average recovery of anthracite was only 40 per cent., that for every ton of coal marketed a ton and a half was lost. Competition was certainly not the life of trade—it was rapidly exhausting an invaluable resource and ruining the companies engaged in the business.

Heroic methods were necessary and they were applied. The business was got under control, improved methods of mining and of preparation were introduced, and devices for utilizing the small sizes of coal and of recovering them from the culm banks were invented, so that at the present time instead of 40 per cent. of the coal being sent to the market the recovery is nearer 70 per cent., and I cleave strongly to the opinion that these improvements upon the earlier conditions will extend the life of the anthracite field 100 per cent. To return to the conditions of cut-throat competition as it existed in the latter part of the nineteenth century would be little short of criminal, our friends in the Department of Justice to the contrary notwithstanding.

Not Much Use To Preach Conservation Alone

Many of the bituminous fields have been until quite recently in much the same condition as formerly obtained in the anthracite region, and when such conditions exist it is not much use to preach conservation. Most of the bituminous operators are making money just now, it is true, but the situation is abnormal and there are many lean years to be made up. With the end of the European War we may look for even worse conditions than those that preceded the present prosperity.

Much of our best bituminous and semi-bituminous coals, as well as anthracite, have been lost through methods that must be deemed wasteful in the light of present knowledge, but which under the circumstances could not be avoided. It is not through reckless competition, but through properly regulated coöperation that the highest possible recovery can be obtained, waste in mining, preparation, distribution and utilization, reduced to a minimum, the public adequately served and protected, labor can receive its just reward and capital a fair return.

Capital, by the way, is generally considered as being able to take care of itself and no particular provision is thought necessary to conserve its interests. But capital is timid—nothing more so—and must be assured of a reasonable degree of safety before it ventures into large undertakings. Modern business, in order to secure the maximum efficiency and minimum waste, requires operations in large units, and large units require large investments. Conservation in mining coal or any other mineral resource cannot be successfully accomplished unless due consideration is given to the conservation of the capital invested.

In a previous paper presented before this Congress (Philadelphia meeting, October, 1913), I called attention to the meager returns on the capital invested in coal mining as shown by the report of the United States census. This report showed that in six states the expense involved in the production of bituminous coal exceeded the revenue derived from it, and that the average return for the entire country on the capital invested in bituminous coal mines was only 2.5 per cent. Such an exhibit is not encouraging to the investment of further capital, nor above all is it helpful to the cause of conservation of life and resources.

Railroad Building Now at Its Lowest Ebb

The present railroad situation is illuminating. With the banking institutions overflowing, railroad building is at a lower ebb than at any time since the Civil War and fewer orders for cars have been placed this year than for a long time. Part of this may be due, of course, to the high prices of all steel products now obtaining, but it is also true that capital is not encouraged to invest in an industry that is the constant subject of antagonistic legislation and of governmental attack through the courts. No objection can be raised to a reasonable amount of governmental supervision and regulation, in order that abuses may not arise, but if the other desirable forms of conservation are to be effected, capital must be given fair consideration.

Fortunately, a new standard of business ethics is now in force. It is a standard that denies to larger enterprises any right to advance prices merely because of a temporary demand over the available supply, and condemns an exaction of profits not commensurate with the capital invested, but it recognizes the right to a fair profit at all times, and the right of capital to demand it.

Competition, if it is to be the life of trade, must be competition that constructs and not that which destroys. Price cutting to secure an order and thus to injure the business of a competitor does not accord with to a high standard of business ethics. It is injurious to the trade as a whole.

Rivalry in Service vs. Undercutting in Price

Other kinds of competition, such as the unfair condemnation of a rival's goods, or of his manner of doing business, are just as reprehensible; but competition of service works for the good of all concerned. Competition of service consists in maintaining the standard of your product, in seeing that your customers are supplied with your goods when and how they want them—not when and how you want to deliver them—in the pleasing personality of your salesmen (for a salesman is frequently the cause of making or breaking a customer), in fact, in keeping your customers satisfied.

The average buyer would rather do business with a concern from which he gets satisfactory treatment than save a few pennies or even dollars at the expense of his temper. The rivalry among anthracite operators (for it is a rivalry) in the securing of better living conditions for their employees, to which I have already referred, is a competition of service. Its object, as I have stated, is through the improved living conditions to develop a better grade of workmen, who by rendering better service to their employers, will enable the latter to render better service to the public.

Photography in the Drafting Room

By H. P. Palmer*

SYNOPSIS—Use of photography in drafting; its advantages. Limitations of blueprinting and similar processes. Advantage in enlargement or reduction of size of drawing by the photo process. The photostat described and its use explained.

Ever since the invention of sensitized paper, the art of photography has been employed by draftsmen to great advantage in various lines and for various purposes.

The chief necessity has always been for copies of working drawings, such as blueprints and Vandykes. To meet this need, a tracing had to be made on transparent paper or cloth to serve as a negative, and from this an impression was made in much the same manner as a photographer makes a print from a film or a plate.

However efficient this method may be for general use, it will only reproduce the original to the same scale; and when a copy of smaller or larger size is desired, a new drawing has to be made. There are mechanical instruments for this purpose on the market, as for example, the pantograph, but every line, word and sign must be traced or a photograph taken.

The photograph is used only when a great reduction in size is made, as the cost of a plate is prohibitive for most standard-size drawings and hence used only in a few cases. Photographs can also be enlarged directly from a small plate to bromide paper, but this entails too great an outlay of labor and money to become popular for the draftsman; in addition, the details are much blurred and nearly always require retracing.

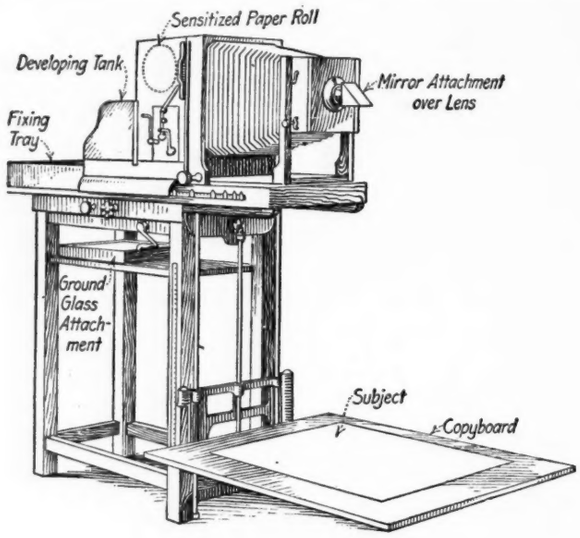


FIG. 1. A TYPICAL PHOTOSTAT

The demand for photographs is largely for copies of drawings. But written letters, checks, contracts and legal papers in general can often be copied only by a photographic process. The United States Government has long used a "photo-lithographing" method for copying patent-office drawings, and insurance companies "photostat" medical examinations, reports, etc. The illustrator uses "silver" and "solar" prints. These methods are all becoming popular in the drafting room, office and shop of many industrial plants.

Tools, patterns, jigs and small machine parts are better recognized and handled when a photograph accompanies the order. By using a photostat (a more economical and practical process than is generally known) large or uneven-sized drawings are made standard size and filed more easily, and field maps of large dimensions are reduced to a practical size for outdoor handling without being made illegible. The grain of ore samples or other minerals, the texture of cloth screen, etc., can also be photographed.

The engineer who has to piece a map together from different sources and to different scales would either have to redraw parts or all of the map and then trace it. With the photostat he can have the parts reduced or enlarged to the same scale and paste them together in their right relation, in which case he only has to trace the work.

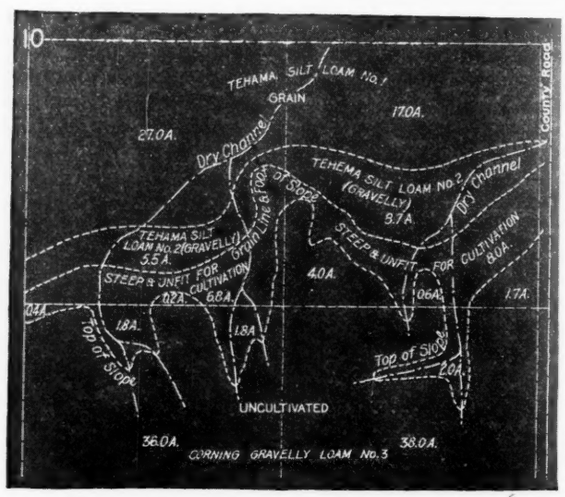


FIG. 2. NEGATIVE PRINT OF LETTERING

A photostat is used daily by the Hill Publishing Co. to reproduce photographs, prints and drawings to a desired size. These are then traced with ink directly on the paper, which is next first bleached in a solution of iodine and later in cyanide, after which it is washed and reproduced in *Coal Age* as a line drawing (Fig. 4), which shows clearer details than the halftone photograph (Fig. 3), with equal exactness of reproduction and at a great saving of high-class labor and time.

While there are other processes on the market to help the draftsman, engineer or illustrator with photographic copies of his work, or work he wants to use, we shall here confine ourselves to the photostat, partly because we use one every day, but mostly because it gives us the best satisfaction.

While the cost of this instrument seems great to many and prohibitive to some, it is sure to save time and labor even for a small drafting room and pay for itself in course of time.

The resemblance of the photostat to an ordinary commercial camera is evident from a glance at Fig. 1. It

*Mechanical engineer, New York City.

consists of a stationary stand with a table attachment movable in a vertical direction to accommodate the subject (nothing over 29x40 in.—larger sizes can be mounted on a convenient wall). By means of a bellows arrangement, the image can be focused to double the size of the original, reduced one-half, or made of any intermediate size desired. The lens is provided with a mirror reflecting at 90 deg. for convenience, but this also can be removed if desired. Like the film in a camera, a large roll of sensitized paper on which the exposures are made is inclosed in the photostat. Our standard is 14x18 in., or half this

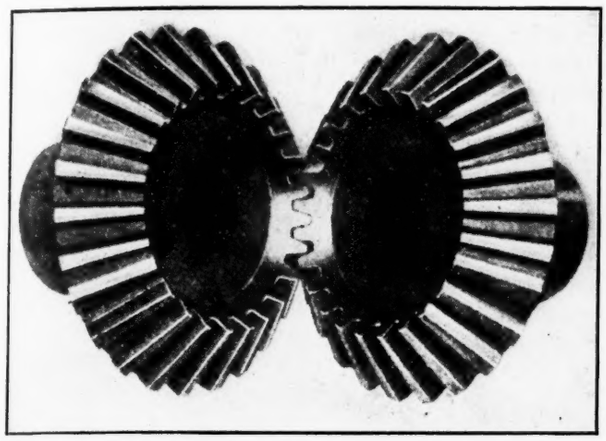


FIG. 3. PHOTOSTATIC PRINT PRODUCED FROM A HALFTONE

area. The prints are always of opposite shade or color to the original, but legible, as can be seen from Fig. 2. They do not fade like blueprints after the chemicals are washed out, and the impressions are as clear as photographs and much more economical. When the exposure has been made for a few seconds, according to the nature of the

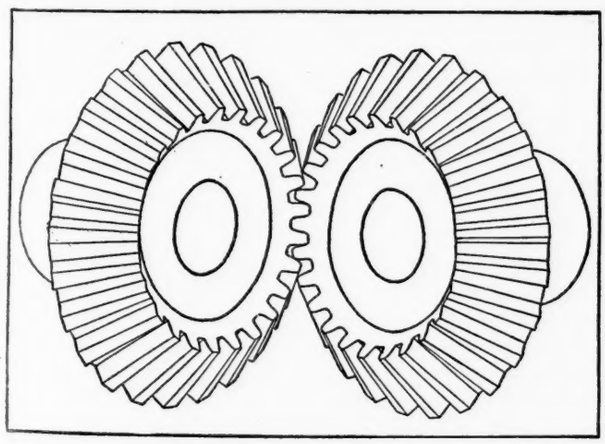


FIG. 4. LINE DRAWING FROM A PHOTOSTATIC PRINT

subject and the light (we use two mercury vapor lamps to best advantage), the exposed part of the roll is advanced by turning a handle, which automatically cuts this part into the developing tank directly underneath. After developing for half a minute, it is washed in the next compartment and passed to the last one for fixing, much the same as a film. The process, however, does not require the attention of a skilled, expert photographer, as it is very simple, each movement being much the same for every series of operations in photostating.

Coal Dredging at Pittston, Penn.

Floating ice in the Susquehanna River has temporarily halted the coal-dredging operations of the Scranton Electric Co., the only concern that has successfully removed coal deposits from the river bed at Pittston. In order to increase the production the company contemplates the building of a new dredge, or the present equipment may be extended.

While the removal of coal deposits has been pursued for years as a business at points south of Plymouth, operations of this nature were not attempted at Pittston on any large scale until two years ago, when the task was undertaken by the Citizens' Electric Illuminating Co., now the Scranton Electric Co.

The principal deterrent to the dredging of coal as a business is the presence in the river-bed deposits here of a large quantity of coal ash. It is estimated that about 25 per cent. of the deposit is pure ash. There is no feasible plan for removing this foreign matter and, as it is entirely waste, it depreciates the value of the dredged coal as commercial fuel and decreases its heating power approximately one-fourth.

It has been found that farther down the river, where coal dredging prospers, this ash is not present and the product is accordingly pure coal, with a greater commercial value. The logical explanation for the presence of the ash at this point is that the collieries along the Lackawanna River, at Duryea and points above, have established ash banks on the river edge and these are washed away by high water, the ashes settling in the Susquehanna River. The ashes from the railroad yards at Coxton are also carried down by the current to this point.

The coal deposits in the river here come entirely from the mines along the Lackawanna River and are on the easterly side of the river basin. These are thickest at a point about 1500 ft. above the Ferry bridge, where the rushing current ebbs into a gentler flow, allowing the coal to sink.

The dredging by the light company has been done by means of a centrifugal suction pump, operated by a gasoline engine. This suction raises through a hose a vast quantity of fine coal, culm and sediment. A revolving screen was formerly made use of to dispose of the mud and fine material, but this has given way to a slanting screen, which has proved the more expeditious method.

Coal barges, towed by a powerful motor boat, are employed to haul the coal from the dredge to the power house of the company, near the river's edge, the coal being hoisted to the boiler room by a conveyor line. The equipment represents a considerable expenditure, but the operation has been profitable.

The output of the dredge is from 25 to 70 tons a day, depending on weather, river and other conditions. The coal is about 50 per cent. rice or smaller, but is suitable for use in the company's power plant, which is adapted to burn this fuel.

The Lackawanna River empties into the Susquehanna at a point just north of Pittston. The former river drains the entire Lackawanna Valley and its waters are always black and choked with culm. Many of the biggest anthracite operations in the Lackawanna coal fields are along its banks.

Safe and Efficient Mine Ventilation*

By D. D. Dodge, Joseph Smith and Henry King

SYNOPSIS—Brief review of mine ventilation and reference to the principle of natural air-columns and furnace ventilation. Advent of the centrifugal fan—two types, exhaust and blower fans. Mine resistance. What the water gage shows in respect to the ventilation. Building of stoppings that are cheap and yet efficient. Need of splitting the air current.

An old definition of a mine is, "Any excavation for the extraction of mineral and in which artificial light is needed." To this someone has added the remark, "And in which the air is bad." This definition applies in every particular to the first coal-mining operations of which we have any record, but the remark that "the air is bad" has had its day in all but a few isolated cases.

The first coal mining was carried on through a single shaft, and the coal was removed back from the bottom of the shaft, until a point was reached where it was impossible to go further on account of foul air. The shaft and workings were then abandoned, and another shaft sunk. On one occasion the workings of a shaft accidentally broke into those of an adjoining mine and natural ventilation at once took place, which caused some surprise at that time, but was the preliminary step to greater things in mine ventilation.

The Air-Column in Mine Ventilation

To fully understand the principle of natural as well as mechanical ventilation, it is necessary to touch upon the importance of the atmosphere that surrounds us. The height of this atmosphere, at sea level, is roughly stated as 45 miles, causing a pressure of 14.7 lb. per sq.in. At any depth below this point the pressure increases and above the same point it decreases. It is this "atmospheric pressure" that causes the air to enter all openings in a mine ventilated on the exhaust system. Pure air consists of 20.9 per cent. oxygen and 79.1 per cent. nitrogen, but the air in a mine is soon vitiated by the mine gases and is unhealthy to breathe and often unsafe, unless fresh air from the outside is constantly supplied by either natural or mechanical ventilation.

In order to maintain this constant supply of fresh air in a coal mine, power is required, because of the fact that an air current passing in a mine meets with much resistance, owing to the friction of the moving air against the sides, top and bottom of the airways. This resistance creates a pressure called the "ventilating pressure."

Many different forms of ventilators have been employed to create the pressure required to overcome the mine resistance. Nature contributes her share in this work, by creating a pressure caused by the difference in weight of the air-columns in the downcast and upcast shafts, respectively, due to the difference in temperature in these two openings. This difference of temperature causes what is known as a motive-column. It is this motive-column that causes the pressure which moves the air current through the mine. This is the whole theory of natural ventilation.

Furnace Ventilation in Coal Mining

Another means of producing ventilation in mines and which was formerly much used is the mine furnace. In well designed furnace ventilation, the furnace is located near the bottom of the upcast shaft. If the mine generates any gas the return air of the mine is conducted by a separate passageway to a point higher up the shaft where it joins the heated fresh air that was fed to the furnace direct from the intake airway. The greater the increase in temperature in the furnace shaft, the greater the flow of air through the mine. The excess weight of the intake column produces the circulation, while the atmospheric pressure causes the cooler air to rush to the point of rarefaction caused by the heat of the furnace. Furnace ventilation is more satisfactory in winter than in summer, due to the lower temperature of the air entering the mine. But at the best it is not considered economical, efficient or safe, especially where gas is generated.

Mine ventilation, in most cases, has kept pace with the rapid progress in other industries, by the installation of modern fans at most mines. Much can be said in regard to centrifugal fans, but here the discussion will be confined to a short analysis of exhaust and force or blower fans. In each case the action of the fan is the same: namely, to create a difference in pressure between its intake or central opening and the discharge opening at its circumference.

Arrangement of Exhaust and Blower Fans

The exhaust fan is so arranged as to create a depression at the fan drift leading to the mine, which will cause a flow of air from the mine airways, into and through the fan. The atmospheric pressure at the intake of the mine forces the air into the mine against the depression in the fan drift caused by the fan's action.

The force fan is arranged so that it creates a compression of the air in the fan drift, which causes the current to flow from this point through the airways of the mine and be discharged at the return opening or upcast shaft. The depression due to the action of the exhaust or the compression due to the force fan is the ventilating pressure required to overcome the mine resistance. In the operation of the exhaust fan the absolute pressure in the fan drift is equal to the atmospheric pressure less the ventilating pressure, while in the case of the force fan the absolute pressure in the fan drift is equal to the atmospheric pressure increased by the ventilating pressure.

The proper location of the fan and the construction of the fanhouse is of much importance for securing the proper efficiency and the necessary safety in case of an explosion in the mine. Fans should be reversible in all cases and constructed to meet this demand.

Mine resistance is greatly increased by falls of rock, abrupt corners, contracted area of airways, increase of rubbing surface and velocity of the air current. The law that governs frictional resistance may be stated as follows:

*Paper read at the winter meeting of the Rocky Mountain Coal Mining Institute, held at Denver, Colo., Jan. 24, 1917.

The pressure required to overcome friction in mine airways increases or decreases (1) as the extent of the rubbing surface; (2) inversely as the sectional area of the airway; (3) directly as the square of the velocity of the air current produced; provided that all the other factors remain unchanged in each respective case. The mine resistance is equal to the pressure exerted on the total sectional area of the airway. From the different factors causing resistance is derived the coefficient of friction, a figure that is variously estimated by different authorities.

The Water Gage and What It Shows

The pressure created by the action of a fan is always an important factor to the men who are responsible for the ventilation of the mine. This pressure is measured by the water gage, a U-shaped glass tube, placed in a perpendicular position on the casing of the fan drift and containing water. When in this position one end of the gage is open to the fan drift and the other to the atmosphere. The gage is sometimes, however, placed in a stopping at the foot of the shaft and, in that case, one end is open to the intake airway and the other to the return.

The water gage is made to read, in inches, the difference of water level in the two arms of the tube. A one-inch reading indicates an air pressure of 5.2 lb. per sq.ft. An interesting and helpful feature is that an increase in the reading of the water gage shows the fireboss that there is some impairment to the ventilation in the form of a rockfall, or empty or loaded cars standing in the airway, or other cause; but a decrease in the gage reading shows the air current has been short-circuited by an open door or other means.

Efficient mine ventilation depends on many important factors and should have the most careful and thorough study before deciding finally on the plan of development. The pitch of the seam may play an important part as an aid to the circulation of the ventilating current. The proper number of entries that should be driven to accommodate the required quantity of air at a low velocity, and the proper location of the fan in relation to the upcast shaft, are important factors and call for the exercise of good judgment. The fact that air follows the line of least resistance necessitates the use of stoppings, overcasts, doors and curtains to confine it to its proper course and conduct it where most needed.

A Cheap and Efficient Stopping

The building of stoppings and overcasts entails an expenditure that affects the cost of ventilation to a considerable degree, and I will consider these items briefly here. A coke-braise-block stopping is light, air-tight and easily placed. One man, with the material at hand, can place two such stoppings in a day. The blocks 8x32 in. cost 14c. each, mixed seven to one. In a crosscut 5x6 ft. this stopping can be built at a total cost of $4.43. A 2-in. plank is placed between the stopping and the roof and the joint made airtight by wedges and grouting.

The principal features of these block stoppings are their cheapness of construction, recoverability, incombustibility and efficiency. The ends of an overcast can be built of the same kind of blocks and covered with 2-ft. pieces of 2-in. planking painted with fireproof paint and placed between 60-lb. rails with a covering of cement and braise or "breeze." An overcast of this description is air-tight, strong enough to carry men and mules if required, and when shot out of solid sandrock will cost between $185 and $200. Such an overcast can be constructed at a minimum cost and will prove serviceable for many years.

The splitting of the air current is essential to efficient ventilation and indispensable to economical mining. An air current may be split one or more times as occasion demands, but wherever possible, splitting should be confined to the first or primary split. Splitting increases the quantity of the air in circulation for the same amount of power applied.

The limit of splitting is reached when the velocity of the air current becomes so low that it does not produce adequate ventilation in the working places. The required distribution of the air in the several splits is controlled by regulators properly placed in the airways.

The quantity of air entering a mine, if rightly conducted, should be not more or less than the state mining laws require and good judgment dictates.

The New Mining Education

We are great on mining education on the Rand. The following questions were set in a recent examination for mine superintendent's certificate. The answers are those given by the candidate earning the maximum number of marks, says "Regulus" in the *Engineering and Mining Journal* of Jan. 13, 1917.

1. In what condition should a mine be to comply with the government mining regulations?

Answer—It should be closed down.

2. What is a ventilation door?

Answer—Something that is left open.

3. What is that about a mine whose operation is most affected by gravity?

Answer—Keeping up the grade, as it always tends to fall.

4. What measures would you adopt when difficulty is experienced in holing a rise and winze?

Answer—Special old Cornish recipe: Take a cat up the rise. Scratch the rock in the winze and drive in the direction to which the cat first turns.

5. What are the duties of a chairman of directors?

Answer—He should take things easy and lie about a good deal on his own and console shareholders nicely at the annual meeting about their losses.

6. What are the duties of mine inspectors?

Answer—They should drink whisky with the good managers and persecute the others.

7. What are smoke, dust and fumes?

Answer—If met by the inspector they are a serious contravention of his regulations, otherwise an unavoidable product of mining operations.

8. What are the duties of a mine manager?

Answer—See answer to Question 6.

Pure Copper Being Malleable, Is Easily Abraded and worn away by contact with harder substances, and copper wire if small in diameter is easily broken. If exposed copper bonds of any type are allowed to come in contact with wagon wheels or other similar objects, one would naturally expect that sooner or later such bonds would be injured or entirely broken. The careful manager who looks after the little details will see to it that such bonds are protected from destructive agencies at the time of installation, and the efficiency of his track return system will be improved and prolonged to a corresponding extent.

Mining a 60-Ft. Vein of Coal in Transylvania

By Emanuel Dufranne*

SYNOPSIS—Most of the coal now secured is from open-cut workings, and it is probable that this method will be continued for a long time. Underground development has been carried on extensively, however, 16 ft. of the measure being taken advancing. Retreat has not yet started, but experiments would indicate that all the coal could be recovered. Compressed air for power is supplied by the inclined-plane machines operating suitable compressors.

In that region of Transylvania recently invaded by the Rumanian army there is a coal field of which little seems to be known in this country, although a bed averaging 60 ft. in thickness has been mined there, more or less indifferently, since the fifteenth century.

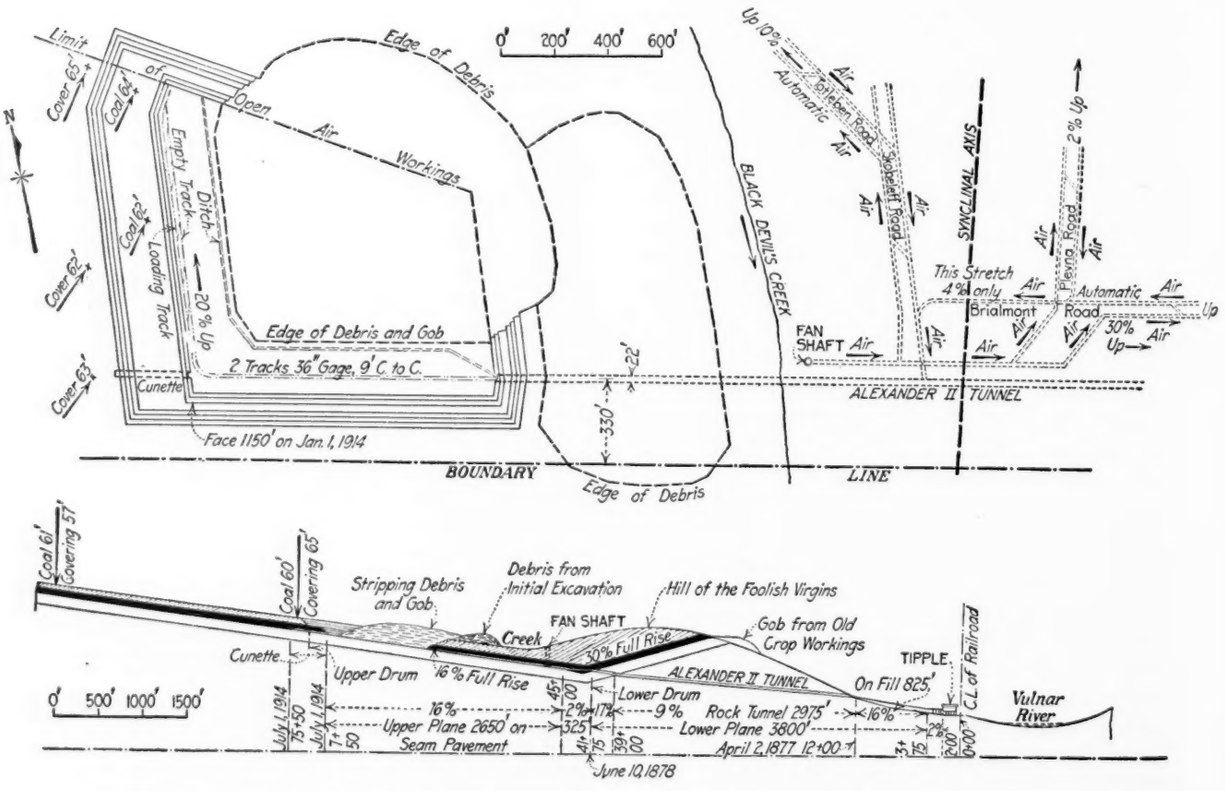
About 40 years ago, when railways running to the Danubian region and the Black Sea ports of Constanza and Varna were first put in operation, it was generally thought that an era of great prosperity had dawned for Transylvanian coal. Capital became interested and large sums of money were spent on high-class and far-seeing development work. But the bright future that had been predicted for the mining industry of that part of the Austro-Hungarian realm failed to materialize. The reasons for this were of two kinds—one political, the other economical. Of the former, this is not the place to speak. Of the latter, I will say that the freight rates on the new railways were exorbitant, being six or seven times as high as the rates applied on the great coal-carrying roads in the United States.

Then, as always happens in countries where the majority of the people is ruled by a small minority of a different race, the Valachs, a Rumanian race forming the working class, showed themselves most unwilling to work for what they called the benefit of their masters. Instead of seeking in the mines what, to most of them, would have meant material prosperity, the Valachs preferred to stay at home. When special laws were enacted, applying only to them and intended to make them work in the mines, the Valachs left the country in great numbers. Many thousands of them emigrated to America, where they are erroneously classified among the Hungarians.

The war that is changing the face of many things, upsetting many old ideas and destroying many prejudices, will perhaps radically change railroad and labor conditions in Transylvania so that the coal fields of that country will, at last, come into their own. Such is my firm hope. I devoted the ten years preceding the war to the management of the Vulnar Collieries Co.'s properties, known in Transylvania as the Black Devil's Mines.

The accompanying illustration shows the main operations of the Vulnar company with sufficient clearness to make a lengthy description unnecessary. Most of the coal produced until now has been mined in open cut. The

*Charleston, W. Va.



PLAN AND SECTIONAL VIEW OF THE MINING DEVELOPMENT OF THE VULNAR COMPANY IN TRANSYLVANIA

greater part of the output will, probably for a long time, continue to be thus produced, the reason for this being that under the greater part of the area owned by the company, the coal, 60 to 70 ft. thick, is at no place covered by more than 65 ft. of earth. This is so soft that no underground mining operations could be thought of. However, the atmospheric conditions that have softened the overlying strata have had no appreciable detrimental effects on the quality of the coal.

That part of the property where the thickness and condition of the cover warrant it has been developed to a considerable extent according to well-known underground mining methods, advantage being taken of the steep pitches of the seam to facilitate haulage by means of self-acting, or automatic, planes. The rooms, all of which are outside the area embraced by the illustration, are driven on the full rise of the seam. Where the pitch is not sufficient to cause the coal to slide down to the heading, self-acting planes are employed to take the cars to and from the faces.

The rooms are 28 to 32 ft. in width, have two tracks, and the hoisting drum is placed near the face between the tracks. A thickness of coal averaging 16 ft. is taken advancing. No retreating work has been done so far, but experiments of a most extensive kind have been made that proved to the satisfaction of all the experts who witnessed them that all coal now left in top and all pillars can be mined with perfect safety and economy.

A glance at the illustration will show that the crosscuts between the roads and air courses are few and far apart. This is made possible by the use of small blowers that force the air ahead through galvanized iron pipes 18 in. in diameter. These blowers are driven by compressed air, as are the drills used to bore all shotholes.

Air at 90 lb. pressure is furnished by compressors actuated by the big drums at the head of the two main planes down which all the coal is lowered to the tipple. Both drums are shown in the illustration. The air is compressed in two stages. The first-stage pistons are driven by the lower drum, while the second-stage outfit is run by the upper drum. The heat due to compression in the first stage is effectually and simply dissipated during the passage of the air from one compressor to the other through a 5-in. pipe laid in a ditch. Over this runs at all times a stream of water at a temperature generally lower than that of the atmosphere.

The compressed air is stored in reservoirs located in rear of the upper drum in a short heading, called a "cunette." This is driven in the seam 400 ft. ahead of the open-cut face. This length was given the cunette in order to make it unnecessary to move, except at intervals of 400 ft., the drum, air compressors and reservoirs that are in the cunette. An advance of 400 ft. means a great tonnage of coal, in a seam 60 ft. thick and on a face more than 1100 ft. long.

The unique way of compressing air that I have described is not only economical in itself, but it permits the drums to be operated without making great use of the brakes. The energy absorbed and utilized by the compression process represents just that much power that need not be dissipated by the brakes in controlling and checking the speed of the trips on the inclined planes.

The arrangement, however, is far from new. The compressor attached to the lower drum was designed and installed by the Swiss engineer Mercier, who drove the rock tunnel from its mouth to the point where it intersects with the synclinal axis of the seam.

The same kind of air-compressing devices will be installed at the head of Brialmont and Totleben roads (headings), after these have been driven to their limit. Thus, with the exception of the fan (a big 30-ft. Guibal machine driven by steam), all power necessary to run the mine and secure quite a large output will be derived from the energy produced by the coal on its way down to the tipple.

All the workings shown in the illustration were laid out on paper as far back as 1878 by the Italian engineer Sommeiller, the man who completed the Mount Cenis tunnel. That the famous engineer's sympathies were decidedly pro-Russian and that he was a military man, is evidenced by the names he gave the different tunnels, planes and roads. Totleben was the defender of Sebastopol, while Skobeleff was the conqueror of Plevna. One name, however, is that of a Belgian engineer, General Brialmont, who (at the time Mr. Sommeiller was at Vulnar) was erecting the then impregnable but now obsolete fortifications built by Rumania along the Lower Danube.

The Vulnar company is 20 per cent. Rumanian, 25 per cent. French and 55 per cent. Belgian.

Coal Shortage in the Far West

A canvass of the coal situation in the West has brought out the following notes concerning the situation there:

Baker, Ore.—One car containing 35 tons of coal received here was exhausted immediately, the dealer receiving it having on hand orders for 300 tons. The Mayor has issued notices asking names of poor who are without coal, hoping thereby to impress state officials in an effort to relieve the situation.

Boise, Idaho—Agitation has started here for the passage of a law allowing cities to engage in the coal business to care for emergencies. Coal dealers claim they can take care of the situation, but city officials in various parts of the state are in opposition. Several cities have sent representatives here to talk with legislators and urge the passage of such a law. Members of the Public Utilities Commission have gone to various points to insist that rolling stock of the railroads be put into motion to relieve the situation in Southern Idaho. It is stated that there are many cars of coal on sidings along the railroads, and a grand jury investigation has been threatened.

Jerome, Idaho—Hotels, schools and many families are entirely out of fuel, and the situation is said to be serious. Several schools have already closed as also have several business houses. Urgent appeals for coal and wood have been tabled, and citizens are using outbuildings and poles for fuel.

The Best Developed Coal Field in Turkey is the Heraclea field. It occupies a belt about 60 km. in length along the Asiatic coast of the Black Sea, between the seaports of Heraclea and Filios. The town of Heraclea itself lies at a distance of 135 nautical mi. from Constantinople. The coal beds outcrop near the coast and are not known to extend farther than 8 km. inland. It is believed, however, that they strike southeasterly from the eastern boundary of the district to which mining operations have been confined and that they may be reëncountered at a greater distance from the seashore beyond. This field produced 566,118 tons in 1913.—Leon Dominian in Transactions of the A. I. M. E.

Organization as It Pertains to Mine Management

By A. B. Kelley*

SYNOPSIS—Organization is the most important factor in the management of a mine and should not be overlooked. The more perfect the organization the more successful the operation. A proper selection of the units forming an organization is a vital essential. Gives rules for the hiring of employees, and suggests that a keen knowledge of human nature is of inestimable value to the proper conduct of any organization.

Undoubtedly the most important factor entering into the successful management of mines is organization. Even apart from mine management, an analysis will disclose the importance of organization in all successful achievements where the coöperation of individuals is a requisite—that is, the government of nations, the conduct of wars, expeditions of discovery and exploration, achievements of commerce, manufacture and transportation. Concrete cases need no citation; they are sufficiently evident at the present time in the European War. Therefore, such an essential factor of such universal importance cannot be overlooked with inpunity in the sphere of mine management. It may be stated to be almost an axiom that success is in direct ratio to the quality of the organization.

The wonder is that so little has been written concerning this phase of mine management. Can it be that its importance is not realized, or has it been overlooked? I shall go upon the assumption that the former is true. Unquestionably, the predominate weakness of officials is in the selection and in the management of their subordinates.

A Properly Managed Organization Means Greater Productive Efficiency

Organization has a direct bearing upon a contemporaneous issue—the scarcity of labor. For it follows naturally that where there is a good organization, properly managed, there will also be greater efficiency, now when efficiency is needed, than there would be otherwise.

Organization as it pertains to mine management involves these two essential features: The selection of the members of the organization, and the management of the organization. Careful attention should be given to the keeping of the members of the organization in working harmony at all times. They are human, and friction naturally occurs at times, but it can be smoothed out by a little tact and diplomacy. As the liability to error is greater in the selection than in the management, there is a compensating feature in that an error made in selection, if not too great, may to a certain extent be overcome by careful management.

There are certain well-defined rules which should govern one in the selecting and in the managing of an organization. These are: Ability (if an official, ability to select and manage men), habits, age, state in life, physical condition, disposition, character and practical education. A brief review of these may be both interesting and instructive.

An organization is composed of organizations within an organization, and therefore an official in choosing a subordinate to head an organization makes the same qualifications a requisite which to himself is most essential—namely, the ability to select and to manage men. There are more failures due to the lack of this ability than for any other cause, and an official who has a subordinate possessing no ability in this respect had better dispense with his services. For it is a very difficult matter, more frequently impossible, for an official to be of assistance to a subordinate in overcoming this weakness. Organizers and managers of men are born, not made. It is impossible, except in a very brief way, to analyze the qualities that make for a successful organizer and manager of men. Undoubtedly personality plays a part in the choosing and in the managing of men. It is in the latter case that so many officials err in that they place too much dependence upon their personality in their dealings with men, and not enough upon the finer subtler methods which are the possessions of the student of human nature.

Most Important To Study Human Nature

The knowledge of human nature, properly exercised, is of inestimable value in dealing with men. A review of history and an analysis of the reasons for the successes of its leaders, discloses the fact that it was in intricate knowledge of human nature—an ability to coax from men the maximum effort. The principle is general. It is applicable in the sphere of mine management as well as in any other. It is essential. How to acquire a thorough knowledge of human nature is not within the province of this article. It is perhaps the oldest, most intricate and most interesting of all knowledge. It was exercised even in the Garden of Eden, by the serpent's appeal to the weaknesses of our first parents. Study the weaknesses of men; an appeal to their vanity is very often a powerful stimulant. It is sufficient to observe in passing that each individual is a separate and distinct problem.

One would scarcely deny that good habits are essential. We need elaborate but little upon this requirement. Bad habits are dissipaters of the energy which is necessary for efficiency. The exercising of good judgment requires clear thinking, something not in the possession of the dissipater.

Youth possesses the advantages of strength coupled with ambition and enthusiasm. These are sterling qualities, but not always combined with sound judgment, which experience has given to the older. Where youth has had the advantage of responsibility, his judgment is developed and his ambition and enthusiasm tempered; but this is a rare combination. Many concerns, large employers of labor, lay much stress upon youth as a qualification, chiefly on account of the enthusiasm which it brings. Enthusiasm is contagious; imparted to subordinates it becomes a contagion. Frequently it carries its possessor over difficulties and obstacles which to the more experi-

*Superintendent, Bessemer Coke Co., Greensburg, Penn.

enced would seem impossible. Enthusiasm is an indispensable asset to success and should be required of both young and old; but being the product of strength and ambition, it is rarely found in the latter. Youth has another advantage not yet mentioned. It has time in its favor. It is a better risk, and therefore becomes a matter of economy. I do not wish to be understood as advocating the cause of the young; the happy arrangement would be a combination of all these qualities, be he young or old.

Married men, as a rule, are more desirable than single men, and this is as it should be, for both altruistic and economic reasons. We shall speak from the viewpoint of the latter only. The added responsibilities of married life make for the valuable qualities of patience, perseverance and reliability. The married man is also less nomadic in his habits, which bears decidedly upon the question of economy.

There are many reasons why a man of sound physical constitution is preferable to the weak one. We shall enumerate a few of the principal reasons. The physically vigorous man is usually the possessor of an abundance of energy. Energy is the driving force; the more powerful it is the more work it accomplishes. The employee of frail or delicate constitution is perhaps liable to lose much time by illness or for recuperative purpose. The positions of great responsibility are more capably filled by the vigorous than by the weak, and also in such positions the loss by death is less where the incumbent is strong than where he is weak. It is very expensive to train men for some positions.

Peculiarity of disposition may assume such form as to be absolutely detrimental to the organization. It therefore behooves the employer to ascertain beforehand the kind of disposition of his prospective employees. An official of an irritable or of a vindictive disposition can certainly be no manager of men. Many peculiar dispositions are encountered, and most frequently they are not discernible, except after a period of time. In this connection I shall relate an incident that occurred several years ago.

The Executive Who Had Illusions

Quite a large manufacturing concern needed the services of a first-class master mechanic. Among the applicants was one who came very highly recommended as a mechanic, but the recommendation did not lay much stress upon the applicant's ability to deal with men. Inquiry brought the information that his disposition was marred by a peculiar idea that his friends or his men were working against his success. It was unfortunate that ability as a mechanic should be handicapped in this way. The superintendent sent for the applicant; had a long talk with him; pointed out this weakness, and advised him that in order to be of any use he must overcome it. The superintendent thus hoped to make a general good man of his applicant. He hired him.

All went well for a period of several months. It looked as though the superintendent had wrought a change which would benefit both himself and his master mechanic. But evidences of discontent began to appear at various points throughout the master mechanic's organization. Two very old and valuable employees suddenly left their positions. Several complaints were made to the superintendent by officials of other departments. An investigation disclosed the fact that the master mechanic was back at his old habit of accusing others of unfair dealings. There was no alternative now for the superintendent if he wished to maintain a high standard organization. So he asked for his resignation, and replaced him with another.

Character and courage are of prime importance in conducting the work of an organization. One could hardly imagine a weak character, given to vacillation, accomplishing anything, even to the choosing of the members of an organization. These are indispensable assets, but should be tempered with reason at all times. Carried too far, they work evil in another way. I have mentioned courage under the heading of character, not that they are synonymous, but that the possession of strong excellent character implies the possession of courage.

A practical education is necessary. It matters not how this education may be obtained. It is an asset that cannot be overlooked. The broader and the more thorough the education the more valuable the man to his subordinates and the easier the man is to manage by his superiors.

Thus I have enunciated in a brief way what the requirements should be in employing and in managing men. The qualities mentioned are all indispensable to the good man. But supreme importance is attached to the first—ability to organize and to manage men. It is a very difficult matter, at times, to choose men without bias, for we are often influenced by friendships or affiliations of some kind. One frequently finds officials employing relatives in subordinate capacities. This cannot but work to the detriment of an organization.

Coal-Mine Fatalities in the United States in 1916

Compiled by Albert H. Fay*

The returns received by the United States Bureau of Mines from the state mine inspectors show that as to the low record of coal-mine fatalities in the United States, 1916 is a banner year. The decrease is about 2 per cent. as compared with 1915, while the production of coal increased about 12 per cent. The number of fatalities reported during the year was 2225 as compared with 2269 for 1915. Figures are not yet available showing the actual number of men employed during the year, but on the basis of the number of men employed in 1915 the fatality rate was 3.03 in 1916 as compared with 3.09 per 1000 men employed in 1915. This is the lowest rate since 1898, when about one-half the number of men were employed.

According to the United States Geological Survey, the estimated production of coal for 1916 was 597,000,000 tons as compared with 531,619,487 tons in 1915, so that the number of tons of coal mined per fatality in 1916 was 269,000 as compared with 234,297 in 1915, and 209,261 in 1914. The production per fatality in 1916 is therefore the greatest in the history of coal mining in the United States.

During 1916, there were 11 mine disasters in each of which five or more men were killed, being the same number as in 1915 and in 1914. The number of men killed by these disasters in 1916 was 154, the lowest since 1901, as compared with 262 in 1915, 316 in 1914 and 464 in 1913. The principal net decreases in fatalities for the year are as follows: Falls of roof and coal, 14; gas and

*Mine-accident statistician, United States Bureau of Mines, Washington, D. C.

dust explosions, 78; explosives, 9; surface accidents of all kinds, 12. While in the above causes there was a gratifying decrease shown by reason of the educational work conducted with reference to the study of gas and dust explosions, and the introduction of permissible explosives, there was a net increase of 43 fatalities due to mine cars and locomotives underground, and an increase of 8 in various shaft accidents. As haulage systems necessarily increase in scope as the mines become larger, there should be a concentrated effort on the part of all to reduce the hazards connected with this feature of the mining industry.

Although the net decrease is not large, it yet shows that the efforts exerted by the various agencies whose object is to reduce mine accidents are meeting with success. Among the means employed to reduce accidents may be mentioned the general use of safety lamps in doubtful mines; the introduction of permissible explosives; humidifying dusty mines; first-aid and rescue training, which save lives that might otherwise be lost by reason of injuries received; the enactment of industrial accident compensation laws, and the spirit of coöperation on the part of all concerned.

Who's Who In Coal Mining

Rush Norman Hosler

Supervisor of Coal Mine Schedule Rating—that's the new position that Rush Hosler has been selected to fill; and the State of Pennsylvania has undoubtedly made a happy choice in selecting him for this place.

Mr. Hosler is 43 years old and is a native of Pennsylvania, having been born in Columbia County. He received a common-school education and in 1896 graduated from the Bloomsburg State Normal School. His first position was on a railroad engineering corps, following which work he entered the employ of the Lehigh & Wilkes-Barre Coal Co., serving this corporation as a transitman for more than two years.

RUSH N. HOSLER
Supervisor of coal-mine schedule rating for the State of Pennsylvania

Leaving the anthracite field, he migrated to Oklahoma, where he was occupied on construction and development work in mines located between McAlester and Howe. Two years in Oklahoma added considerably to his mining experience, and in 1902 Mr. Hosler returned to Pennsylvania, accepting a position as chief engineer of the Morrisdale Coal Co. at Morrisdale. He filled this place for 10 years during which time he became familiar with bituminous mines in practically all of the central and western Pennsylvania fields.

It was about this time that the Rochester & Pittsburg Coal and Iron Co., Jefferson & Clearfield Coal and Iron Co., Pittsburgh Gas Coal Co., etc., needed an engineer for all their mines around Indiana, Penn. Rush Hosler got the job and carried on this work until in 1914, when he became development engineer for the Davis Coal and Coke Co., with offices at Thomas, W. Va. During his stay in West Virginia much of Mr. Hosler's time was spent in investigating and prospecting coal lands. His appointment to the interesting and important new position in Pennsylvania came as an agreeable surprise to all of his friends. Knowing him as they do, however, they feel the State of Pennsylvania should be congratulated on getting the right man, as well as the man on getting the job.

Anyone who anticipates that Rush Hosler will have an easy time of it in establishing and perfecting a satisfactory system of rating for compensation insurance is reckoning without reason, for no more delicate task could be assigned an innocent and unsuspecting engineer. When 12 months roll around we predict that Mr. Hosler will actually have earned the neat little salary that goes with his new job.

He is a member of the Coal Mining Institute of America and the Engineers Society of Western Pennsylvania. Few young men living and working in the populous coal regions of Pennsylvania and West Virginia have as large an acquaintance in mining circles as Mr. Hosler, and none has more well-wishers.

RECENT LEGAL DECISIONS

Assumption of Risk in Dumping Operations—A coal miner assumed the risk of injury resulting from coal falling down a shaft in the operation of a self-dumping cage, it appearing that the apparatus was of standard make and in general use in coal mines, and that some coal always fell. (Arkansas Supreme Court, Harrison vs. Western Coal and Mining Co., 182 Southwestern Reporter, 525.)

Liability for Defect in Coal Pier—The owner of a pier designed merely for use in loading coal and not as a passageway to the shore is not liable for injury to the captain of a coal barge who fell into a hole in the pier while attempting to walk along the pier to the shore in the night time. (New York Supreme Court, Appellate Division; Quinn vs. State Island Rapid Transit Railway Co.; 156 New York Supplement, 568.)

Liability for Negligent Exposure of Explosives—A mining company is liable for injury to a child resulting from the company's employees throwing cans containing small quantities of unused powder in a place accessible to children, although the accident was directly due to children gathering powder from such cans, carrying it some distance and one of them igniting it, especially where it appears that the company's "powder monkey" was present when the powder was taken away and did not object. (Oklahoma Supreme Court, Folsom-Morris Coal Mining Co. vs. De Vork, 160 Pacific Reporter, 64.)

Car Shortage Forces Adoption of War-Time Measures

Under date of Jan. 19, the Navy Department has issued the following statement:

1. In connection with the effect of existing car shortage on the movement of coal to destinations for navy loading or consumption, it recently became necessary to enforce that part of the Navy Act of Aug. 29, 1916, providing for the prompt delivery of Government materials, which is as follows:

That in time of war or threatened war preference and precedence shall, upon demand of the President of the United States be given over all other traffic for the transportation of troops and material of war, and carriers shall adopt every means within their control to facilitate and expedite the military traffic. And in time of peace shipments consigned to agents of the United States for its use shall be delivered by the carriers as promptly as possible and without regard to any embargo that may have been declared, and no such embargo shall apply to shipments so consigned.

2. Under the foregoing act it has been held to be mandatory upon the transportation company to supply the necessary equipment for the delivery of Government stores, but in order that there could be no question of the propriety of such action, especially in so far as relates to the obligations between railroad and shipper of commercial freight, an opinion was solicited from the Interstate Commerce Commission as to the duty imposed upon the railroads under the act referred to. The reply of the commission is as follows:

. . . In reply I beg to state that the commission fully recognizes the law to which you refer as imposing upon the carriers the duty of promptly moving the property of the Government without regard to embargoes. Under that law, in the view of the commission, carriers have a perfect right to provide preferentially cars for Government shipments of coal. But all cars so provided must be counted day by day by the carriers against the distributive share of the mine to which they are given, and if on any day the number of cars so assigned exceeds the allotment to which that mine would be entitled under the percentage arrangement it should not be given any additional cars; and on other days it should be given additional cars only sufficient to make up the total of its ratable percentage for the day. . . .

3. In order that the railroads may have full knowledge of the equipment required to move navy fuel, it is suggested that coal suppliers, immediately upon the receipt of orders for coal, furnish the railroads with specific advice of the cars necessary to transport such tonnages; also that the railroads be kept informed of all equipment carrying navy fuel in order that such cars may receive expeditious delivery at destination.

4. Arrangements will be made whereby the transportation company may receive a copy of the order to the coal supplier.

IN LIGHTER VEIN

The Great Moment

There come tense moments in the lives of men
When they are moved to ponder once again
On mighty matters, with big meanings fraught.
All lesser happenings become as naught
And take their natural and proper place
As trifles in these moments when we face
Big issues; and the tongue cannot give speech
At times like these, of what avail to preach
Preparedness? The time for that has past,
We know the folly of delay at last.

And so we gathered round with bated breath
And solemn thoughts, and silence as of death;
As sliding to our cellar through a hole
We watched the passage of a ton of coal.

—Beatrice Barry in New York "Times."

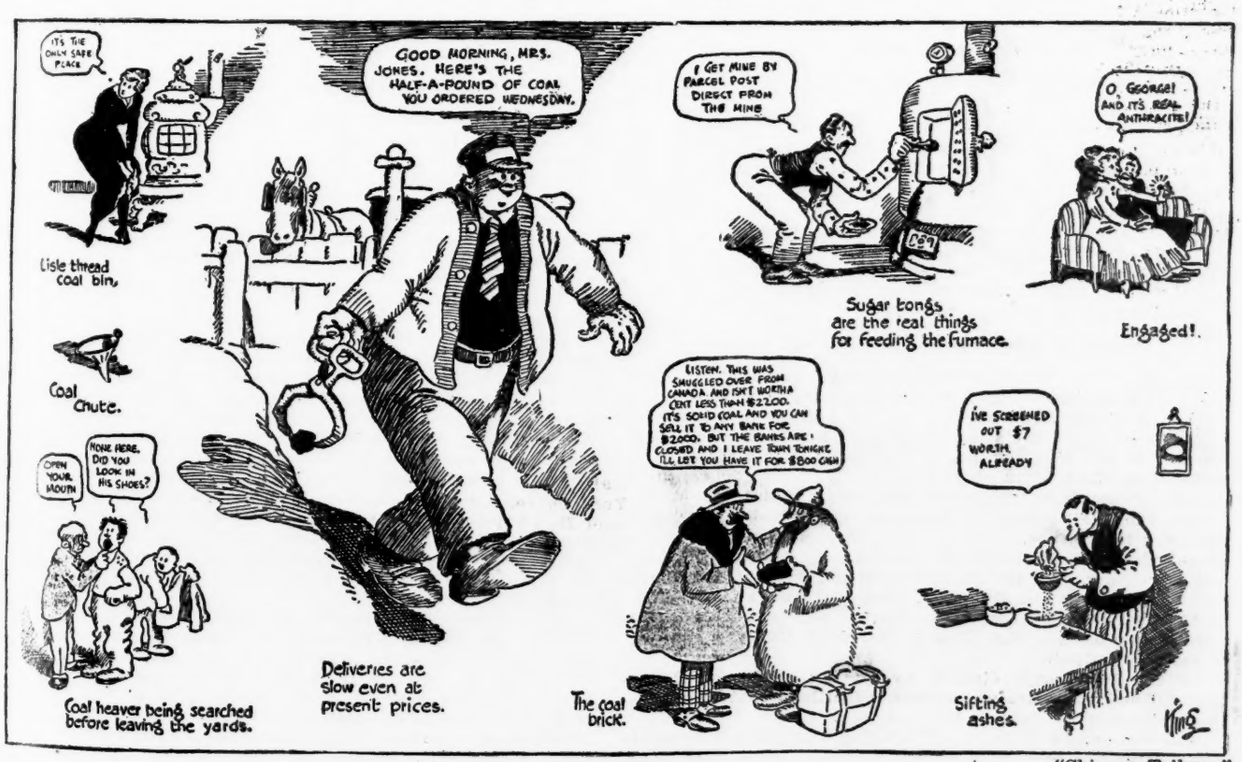
COMING MEETINGS

American Institute of Electrical Engineers wil hold its mid-winter convention in New York City, Feb. 7-9. Secretary, F. J. Hutchinson, 33 West 39th St., New York City.

American Institute of Mining Engineers will hold a meeting Feb. 19-22, at 29 West 39th St., New York City. Secretary, Bradley Stoughton, New York City.

Canadian Mining Institute will hold its annual meeting at Montreal, Canada, Mar. 7, 8 and 9. Secretary, H. Mortimer Lamb, Ritz-Carlton Hotel, Montreal, Can.

The New England Coal Dealers' Association will hold its annual meeting Mar. 28 and 29 at Boston, Mass.


IT'S THE ONLY SAFE PLACE
GOOD MORNING, MRS. JONES. HERE'S THE HALF-A-POUND OF COAL YOU ORDERED WEDNESDAY.
I GET MINE BY PARCEL POST DIRECT FROM THE MINE
O, GEORGE! AND IT'S REAL ANTHRACITE!
Lisle thread coal bin.
Sugar tongs are the real things for feeding the furnace.
Engaged!
Coal chute.
LISTEN. THIS WAS SMUGGLED OVER FROM CANADA AND ISN'T WORTH A CENT LESS THAN $2,200. IT'S SOLID COAL AND YOU CAN SELL IT TO ANY BANK FOR $2000. BUT THE BANKS ARE CLOSED AND I LEAVE TOWN TONIGHT. I'LL LET YOU HAVE IT FOR $800 CASH
I'VE SCREENED OUT $7 WORTH ALREADY
OPEN YOUR MOUTH
NONE HERE. DID YOU LOOK IN HIS SHOES?
Deliveries are slow even at present prices.
The coal brick.
Sifting ashes.
Coal heaver being searched before leaving the yards.
King

"Chicago Tribune"

WHEN THE PRICE OF COAL IS UP

The Labor Situation

General Labor Review

On Feb. 7 the Anthracite Conciliation Board held an all-day session in Philadelphia to act upon cases on which testimony had been heard during the preceding month. As a result 25 cases were disposed of. C. P. Neill, the umpire of the conciliation board, recently decided the grievance of the miners of Harleigh No. 7 colliery. In his decision he declared that the quibbling of the anthracite operators over back pay and pay rates "may justly be considered an attempt to destroy the orderly process through which the last agreement was negotiated."

He said that the miners throughout the anthracite region are entitled to back pay on the increase agreed upon and that any effort to penalize the workers threatens the peaceful conditions of the region. In the Harleigh case the company alleged that back pay could not be given some of its employees because they were formerly contract men and consequently the company had no records on which to base the increase. The umpire declares that it is the duty of the companies to keep a record, and that any effort to deny payment for lack of records is quibbling.

Miners and Breaker Boys Are Dissatisfied

The 1000 employees of the No. 14 colliery of the Lehigh Coal and Navigation Co. are still on strike. In a conference of the officers of the company with the United Mine Workers of America nothing was accomplished, and it is freely predicted that the entire Panther Valley will go on strike unless the dispute is settled within a short time. The men want what is known as "consideration pay," which is 42c. per hr., for all work which they contend comes under that head. The rate for company miners is $2.75 per day, and it is alleged that the company is applying it to men who should receive the higher rate.

On Feb. 7 collieries 4, 5 and 6 of the same company went on strike, laying 3500 men and boys idle. The breaker boys want 20c. per hr. instead of 12c., the present scale.

The Delaware, Lackawanna & Western Railroad Co. coal department had a two-day strike at the Pyne mine, Taylor, Penn., commencing Feb. 9. It related to the eligibility of a check-docking boss to serve on a colliery grievance committee. While the strike lasted 900 men were idle. The officials of the union disapproved of the strike and, in fact, were not notified that it was purposed.

The board appointed by the United Mine Workers of America to settle the standing of the rebellious locals at Shenandoah met Feb. 9 at the Pottsville courthouse. As already stated in previous issues of "Coal Age," these locals, comprising 4000 mine workers, entered into an unauthorized strike and were suspended. The men threatened to push their suit against the union in case the locals are not reinstated. Their demand practically amounts to a declaration that the union had no right to discipline the locals for violation of the mine workers' contract.

Allegheny Valley Grants 10 Per Cent. Bonus

On Jan. 30 the Allegheny Valley Coal Operators' Association held a conference at Kittanning, Penn., with the representatives of the mine workers of the section in which the members of the association operate. They agreed to give the miners the 10 per cent. bonus which had already been conceded in other parts of District No. 2. About 2000 miners receive the increase, which will go into immediate effect.

The labor situation in Somerset County, Pennsylvania, continues to improve. The working force and output of the mines of the Knickerbocker interests at Hooversville are still increasing. All the mines in the county continue working, S. K. Bowman & Son, C. J. Rowe & Bros. and the Merchants Coal Co., Elk Lick mine, having returned to work on a nonunion basis. The Grassy Run Coal Co. has also increased its output.

In the Pittsburgh district everything seems quiet and peaceful and there are no surface indications that there will be trouble now or even in the future.

The car supply in both the western and central Pennsylvania fields has been worse than ever during the past week, and the extreme cold weather prevailing most of the time has made it hard to keep the outside men at work; thus operations have been hampered even when cars have been at hand. The railroads are so congested that frequently they are unable to move cars from the mines for two or three days after they are loaded, and the mines are often unable to work even when the railroad has empty cars which would be available if only the tracks were not blocked with loaded equipment. Where the mines dispose of their product by the rivers their work is hampered by the large amount of ice with which the rivers are filled.

Illinois Strikes for Machines and House Coal

At the west mine at Nokomis, Montgomery County, central Illinois, the machine men have had to work double shift, as the tonnage could not be obtained without that provision. The mine workers struck, and after about two weeks went back to work with the promise that single shifting would be arranged as soon as it was possible to secure enough machines.

The Chicago & Carterville Coal Co., of Herrin, Williamson County, Ill., has an agreement with its mine workers that the price charged for washed nut coal to its employees shall be $1.73 per ton. Since the price of coal has gone up the company has ceased to supply fuel to its men. On Feb. 9 the mine workers of both the company's mines, about a thousand men, went on strike to compel the company to continue the selling of the coal.

It is the old problem. The mine worker buys coal where he will when the price in the market is lower than the company's figure. He insists on that privilege of buying in the lowest market, and it is conceded to him. The market price goes up and the condition is reversed. The operator desires liberty to sell or not at his pleasure, and the mine worker comes out on strike to compel the operator to sell him the coal he desires and which he cannot buy of anyone else for so low a figure.

The labor leaders of Illinois are waging an active campaign in the legislature for the passage of an injunction bill which will provide that any person who is cited for contempt of court in alleged violation of an injunction shall be privileged to have the facts determined by a jury and not by the judge who issues the writ.

Foci of Unrest in Western Kentucky Region

A determined effort is to be made to unionize Hopkins, Webster and Union Counties, the counties lying between Muhlenberg County and the Ohio in the western Kentucky coal region. Headquarters have been opened at Madisonville in Hopkins County and many organizers have arrived, some of whom are from Colorado. Five men, two white and three colored, are under arrest at Providence, Webster County, Ky. They are charged with arson. It is alleged that they attempted to burn the barn of a negro teamster who advised his friends not to join the union. It is said the five men are organizers.

Apparently the People's Mining Co., at Henderson, on the Ohio River, in western Kentucky, has had another strike. One was recorded in last week's issue. In that case the company tried to lay off a septuagenarian and was compelled by a strike to keep him at work. The 45 miners and 16 surface men, however, came out a second time when the management advanced powder from $1.75 to $2 per keg and fuse from 65c. to $1 per hundred feet. The Town of Henderson, having two of its schools and a factory closed, has agreed from now till Sept. 1 to supply powder and fuse at cost to the miners. The mine workers say that the price of coal has risen from 8 to 12c. a bushel, and that consequently increases in the price of powder and fuse should not be met by them, but by the company.

Fifty miners employed by the Elkhorn Coal Co., at Kona, Letcher County, Ky., threatened recently to walk out. The men wanted increased wages, alleging that the necessities of life had in some cases doubled, while wages had not advanced in proportion. S. L. Bastin, the president of the company, says that 15 men asked for the increase and attempted to organize a strike. Seven were discharged and the other eight decided to keep on working.

There has been much friction and resultant idleness in the Kansas field. The mine workers feel that they have matters in their own hands. The operators are so anxious to work and prices are so abnormally high that the mine workers believe it is a good time for them to "get theirs."

The district board in Kansas recently passed a motion that strip-pit employees should work no more overtime until further orders. Commissioner Johnson, of the Southwestern Interstate Coal Operators' Association, has appealed to President White, who has responded that the matter is one for the district officers to decide, and not one in which the national officers can well interfere. The correspondence just mentioned arose partly from the demand for double pay for overtime. The concession was asked despite the fact that the clauses in the district agreement provide only 50 per cent. extra pay in such cases.

The mine workers refuse to work overtime unless they are promised double pay. The foreman often has some work he desires done after the regular working hours because only at that time does he desire to have the mine idle. For this reason he asks certain men to stay late so that the work can be done in time for the next day's run. The men immediately dicker for double pay, and the foreman realizes that he must either pay it or close down the mine the next day and do the work while the mine is idle. When a strike occurs from this cause the men eventually go back to work, but so far the district officials have not placed their disapproval on such demands.

Price of Mining Supplies Is Again an Issue

The growing cost of fuse, dynamite, blasting paper, carbide, tools and supplies is making trouble in Kansas as in other fields. The price of these supplies is not part of the contract, though the cost of the powder is. Sect. 16, clause 1, says: "The price of powder during the life of this contract shall be $2 per 25-lb. keg. The powder furnished shall be of standard grade and quality." In most fields the companies have conceded that the supplies needed for mining shall be kept at the old price so as not to decrease the earning power of the miner. The miner desires that the same rules obtain in Kansas also. The operator feels he should be allowed to charge cost plus a small profit. Instead he finds prices increased 75 to 100 per cent. and the old prices still operative. There have been several strikes to enforce the lower price during the past three weeks. Several companies have made adjustments by which there is a loss of 85c. per man per pay, or $1.70 per month.

Though in some ways labor conditions grow steadily worse, a ray of light has appeared at last. Some of the local unions have refused to obey the orders of Alex Howat, the district president. He recently issued an order that no men should work where mechanical shotfirers were used. The mechanism is an ingenious contrivance by which shots can be fired from the surface electrically in the order provided. In some cases the miners lost time and tonnage owing to the failure of the shots. This was due, it is alleged, to the faulty work of the miners themselves and not to defects in the mechanism. The men demanded payment for the time lost regardless of the cause of the failure.

Miners Said To Favor Mechanical Shotfirers

It is said that the miners themselves favor the use of the machines, and only in two mines, those of the Clemens Coal Co., at Pittsburg, Kan., did the miners respond to the order of the district president. In all other cases the miners continued at work. Howat is then said to have issued a statement that the miners should use their own pleasure in the matter, but recommended that the mechanical shotfirers be forced out. Whatever disadvantages may result to the mine workers from the use of mechanical shotfirers it is certain that they save life, and the determined support from the men is creditable to their humanity.

Committees representing miners and operators have agreed upon a legislative program for Kansas, comprised under four heads. A commission is to be created as a result of this conference to report a new code of mining laws two years hence. The commission will consist of two men selected by the miners, two named by the operators and two appointed by the governor of the state. It is planned that a fund of $5,000 be appropriated by the state for the use of this commission. Several rescue stations are to be erected in the mining district of southeastern Kansas. Bathhouses of a design such as will make them comfortable and efficient are to be made obligatory, and a commission is to be appointed for the purpose of examining foremen, "gasmen," hoisting engineers and others.

The American Mining Congress is actively agitating the passage of an industrial investigation act along the lines of the Canadian act having that name. Under the operation of this law disputes between employers and their employees that vitally affect public interests will be investigated in advance of any drastic action by either side, in order that the public—the final arbiter—may be in a position to exercise its power intelligently.

The recent and unexpected strike of coal teamsters in Chicago, at a time when the city was on the verge of a coal famine, would have been impossible if such a law had been in effect. The operation of the Colorado law, which was patterned after the Canadian act, has been gratifying, and employers of labor in that state approve of it thoroughly. Organized labor, however, seems to disapprove of the Colorado legislation, and it is said that Samuel Gompers is threatening the congressional committees at Washington who are giving the matter consideration with an open violation of any national act which might be passed by Congress along these lines. Seeing the evil effects of uncontrolled and nation-wide strikes in the hurried passage of the Adamson 8-hr. bill, all employers should exert their influence in behalf of the passage of a compulsory investigation act.

The International Auditors' report of the United Mine Workers of America shows that in the second half of 1916 the total income has been $504,648.94, roughly at the rate of a million dollars per year. The expenditures have been $375,799.18. There was a balance on hand June 1, 1916, of $288,169.15, which balance was increased in the half-year to $417,018.91. Among the expenditures may be noted $11,096.09 to the American Federation of Labor; $2732 to the mining department of the American Federation of Labor; $3950 for expenses of branch office No. 1, Trinidad, Colo.; $1472.95 to Representative Samuel B. Montgomery, of West Virginia, for attorney's expenses; $1000 to George Hargrove for the flood sufferers in West Virginia, and $1000 to the "Industrial Relations Committee."

Government Will Pay Men Retroactive Bonus

The trouble in Canada is at an end. The mine workers and the operators of district No. 18 have agreed that an increase of 9½ per cent. shall be granted, to date from Nov. 16, 1916. The two principal consumers in the field—the Trail smelteries and the Canadian Pacific R.R.—have agreed to pay a countervailing advance on their contract rates to the operators, beginning Feb. 1 last. From that date onward the operators will pay the increase to their men. The Government has agreed to foot the bill for payments to be made on the work done between Nov. 16 and Jan. 31. The actual increase will run about $1.75 per week for every man employed by the mining companies. The Government will have to pay the increased rate for 2½ months, or about $4.50 per man.

The strike has caused much suffering, as the thermometer in the prairie country has fallen 10 to 30 deg. below zero, and there was a severe shortage of coal in many towns and villages of Saskatchewan and Alberta.

Safety First*

Never let your fancies roam,
Never be "Nobody Home";
Keep a level-headed dome,
"Safety First."

Be sure the treacherous roof you test;
Be careful where you sit to rest;
Beneath a timber's always best,
"Safety First."

Don't open powder with a pick,
It might explode, then death comes quick;
Never do this foolish trick,
"Safety First."

Look out for electric juice,
And see the timbers are not loose,
And beware the mule's caboose,
"Safety First."

Don't indulge in any booze;
Keep the car wheels off your shoes,
And be liberal with the fuse,
"Safety First."

Study up that first-aid fad,
If you don't, you'll wish you had,
Some day you will need it bad,
"Safety First."

There are no angels watching you;
Other guys have found it true
That God helps those who think and do,
"Safety First."

*Poem by K. H. Chisholm, of the Bureau of Mines, which appeared in the December, 1916, "Safety Bear Letter" of the California Industrial Accident Commission.

Editorials

American Coal in France

That there seems to be a future for American gas coal and coke in France is the opinion of the American Industrial Committee, sent to France by the American Manufacturers' Export Association, and which has recently returned here after an extended visit in that country. The committee's report says that the consumption of gas coal amounts to several million tons annually; that it must have a low ash content, a certain amount of volatile matter and that the best coal for that purpose is found in Pennsylvania and West Virginia.

The committee states that the outlook for coal shipments to France during the war would be encouraging if the transatlantic freight rate could be reduced to something like $10 per ton for the Atlantic ports and about $12 for the Mediterranean ports. The present prohibitive rates are due not only to the lack of ships, but because it is hard to obtain suitable return cargoes from France.

Coal consumption in France before the war averaged 60,000,000 tons per year, while the production was about 40,000,000 tons. Of the 20,000,000 tons shortage, England has supplied about 13,000,000 tons; Germany, 3,500,000 tons; Belgium about 3,500,000 tons, and all other countries combined, including the United States, 300,000 tons. In 1914 the production had decreased 10,000,000 tons and the following year there was another 10,000,000 tons decline, leaving the 1915 production about 20,000,000 tons.

Since the outbreak of the war there has been a fall in consumption to 40,000,000 tons, leaving the shortage, as before, 20,000,000 tons. In 1914 there was imported into France 15,430,000 tons, of which 11,000,000 tons came from England; and in 1915, imports amounted to 19,067,000 tons, almost all of which was from England.

The average price of French coal, at the mines, before the war advanced from 11.49 francs in 1893 to 15.51 francs in 1912. At present the coal from French mines is sold at from 15 francs to 45 francs, according to quality and condition, while the coal from foreign sources is sold at 150 francs and upward.

It does appear that there is a great opportunity for American coal in France if bottoms could only be obtained in which to ship it. What is true of France is likewise true of most other European markets. No anthracite at all is produced in France, and this particular grade of fuel would bring an enormous price. With foreign coals selling for a minimum of $30 a ton, even high rates for shipping should not prevent American producers from entering this market. That we cannot participate in this trade is only a further condemnation of our inadequate shipping facilities.

With sufficient labor our tidewater mines could easily produce 25,000,000 tons more than their present annual output. Labor is scarce, but the reason it cannot be obtained in the mines is because the wages are so much less than these men just at present receive in many other lines of work. If we could get war prices for coal, just as the steel and the copper producers are doing, the mines shipping such coal abroad could easily afford to pay wages that would attract enough labor to produce the necessary tonnage. However, if our large coal companies cannot be aroused to even take a worth-while interest in our neighboring South American markets, it is expecting too much to hope that they will put vigor behind their efforts to break into the coal markets of Europe. Some day those companies having the right kind of coal and a location favorable to tidewater will go into the shipping business and consider that just as legitimate a field for their activities as the production of the fuel itself. A company may not operate a railroad and at the same time own mines on its line of transportation, but transporting coal on the ocean in competition with foreign ships and foreign producers would be a different proposition.

Perhaps it is a blessing that the Standard Oil Co., or at least the same interests, has actively entered the coal industry. It has made American oil well known almost the world over. It owns both ends of its business—producing and transporting. When some similar arrangement is applied to coal mining, the available American market will not be bounded on the east by the Atlantic Ocean.

Coal-Mine Fatalities in 1916

In another column is published a brief and interesting notice by Albert H. Fay on the coal-mine fatalities of last year. The record is quite encouraging, as it appears that the production per life lost has increased from 234,297 tons in 1915 to 269,000, approximately, in 1916. This is a considerable gain, and it follows a series of records that of late years have shown almost steady improvement year by year.

The death rate per thousand men employed is shown as having fallen from 3.09 in 1915 to 3.03 in 1916, as calculated on the basis that the number of men employed in 1916 was the same as those working in 1915. This assumption is somewhat hard to grant.

In 1915, Pennsylvania mined 45.5 per cent. of the whole production of the United States. The number of men employed in Pennsylvania is therefore an important index of conditions. In fact it is more than an index. The production of Pennsylvania is so large that a big loss of men in that state is almost sure to seriously affect the figures for the whole country.

Frank Hall gives the following estimates for Pennsylvania in 1915 and 1916:

Mines	Men Employed 1915	Men Employed 1916	Decrease In Numbers	Decrease In Percentage
Anthracite	168,019	155,689	12,330	7.34
Bituminous	183,192	171,477	11,715	6.39
All Pennsylvania	351,211	327,166	24,045	6.85

In both the anthracite and bituminous mines of Pennsylvania, therefore, the decrease in working force is roughly 7 per cent., whereas the difference in the

rate per thousand men employed as figured tentatively by Mr. Fay on the basis of undiminished forces of men is about 2 per cent. Consequently the figures will probably show that in 1916 there was an increased fatality rate per thousand men employed.

However, the increase has been small, and in view of the steadiness of the work not altogether unexpected. The tonnage gain is the right criterion. The public demands the coal, and it is for the industry to give it to the consumer with the minimum cost of life per ton. An increase in tonnage of 12 per cent. with a decrease in fatalities of 2 per cent. is good progress, even though it falls far below the sanguine dreams of those who believe most fervently in the beneficial effect of compensation. Compensation is doing a great work, but its action is slow and limited.

The net increase of 43 fatalities from mine cars and locomotives underground needs careful laying to heart and close analysis. Mine cars are built with narrow gages and, worse yet, short wheelbases. They are accordingly easily lock-bumpered and derailed. The long couplings made necessary by short wheelbases and sharp curves add to the trouble. It is essential that motormen be urged not to start up or slacken speed too suddenly. This will save wrecks in two ways—directly, and by sparing the cars. A car may be weakened structurally and made unsafe by careless handling even without leaving the track.

If we are going to make good speeds in mine haulage, we must provide equipment to correspond; the motormen must be trained in their duties, and the road bed must be built to accord with what is demanded of it; and then we must modify our manner of operation. There are too many flying switches, too much pushing of trips, too much reliance on momentum in making up deficiencies in motive power.

The maintenance of equipment and of track must be made a matter of careful scientific study, as is the maintenance of cars and road bed on railroads. So long as two or three cars traveled along behind a jogging mule there was little cause for apprehension. Now we have far more numerous dangers to meet, and we must contend with them scientifically.

When a car dumper puts his head between cars in uncoupling, he is doing a dangerous thing and he may meet his end in the act; but perhaps the wheelbase that causes lock-bumpering is also partly to blame for his death, and the bumpers may be too stubby or too weak. Maybe the speed with which the other cars bumped into the trip was an important cause of the fatality; perhaps the fact that the cars had to be uncoupled on a curve had something to do with the accident; and it is quite likely that the condition of the track made lock-bumpering easy—if that is what occurred. Many other secondary causes may be held to explain the accident.

Nothing would have happened if the workman had kept his head out of the way. That is doubtless true, but nothing would have happened if the savage bumping of the cars had not occurred or if conditions had been so favorable that a bump, if sustained by the cars, would not have brought them so close to one another. Instead of hunting for a single "goat" on which to unload the blame, let us look for the many causes out of which this and almost all accidents are evolved.

The equation, like almost all others, has more than one unknown quantity. You cannot solve it without considering them all. It is almost grimly humorous the way in which the South African inspectors have divided responsibility for all the accidents in the mines of that Union. There is hardly a car accident where several parties are not to blame, in which a half dozen men—managers, car designers, tracklayers, foremen, motormen, trip riders or miners—have not been in contributory, even if in unwitting, negligence. Often not the least of the collaborators in producing the unfortunate consummation is the hapless victim.

Coöperation in the Selling of Russian Coal

A bituminous-coal syndicate has existed for some time in the Donetz coal basin of Russia. This syndicate is known as the "Prodougal," a word derived from "prod," meaning "to sell," and "ougal," signifying "coal." A new organization is now proposed, to be known as the "Centrougal," which would centralize the sale of all kinds of coal produced in the basin.

The new plan has been adopted by a special commission composed of delegates from four or five governmental ministries and of representatives of the collieries. The Centrougal is an obligatory syndicate which will regulate the market which has hitherto been much disorganized. According to the scheme, the Centrougal will be composed of 15 members elected by the Donetz coal operators. Each vote will represent an output of 10,000,000 poods (about 180,000 short tons) of combustible mined during the previous year. The small mines may combine to make up the tonnage which will entitle them to delegates. It is expected that these small operations will control about five out of fifteen members. Elections are to be held every five years. Representatives of the four ministries and of the Governmental Controller will have a consultative voice, and the delegate of the Ministry of Commerce and Industry will have a right to suspend briefly the action taken at meetings of the committee.

To sum up the plan, the soft coal, anthracite, coke and briquettes produced in the Donetz basin will be sold to the Centrougal, which will be obliged to buy them and which will in turn sell the fuel at prices fixed by the Ministry of Commerce and Industry. To cover the costs of selling and to form a reserve fund, the syndicate is allowed to take a commission not exceeding 10 per cent.

The collieries must report the details of their business to the syndicate, which will have access to their books. Starting from the day on which this plan goes into effect, old contracts between sellers and buyers become null and void. The authors of the Centrougal purpose to maintain its operations after the war is over.

Germany has its Westphalian Syndicate; Russia proposes a scheme of centralization that is quite similar to the German plan. American operators in several fields have long believed that the coal industry of this country would be materially bettered if some plan of centralized selling could be perfected under Federal supervision. An industry cannot shine as an exponent of safety and conservation unless those in the industry can earn a profit. Today things look good, but there is always a tomorrow, just as there was a yesterday. This action in Russia at least furnishes food for thought.

Department of Human Interest

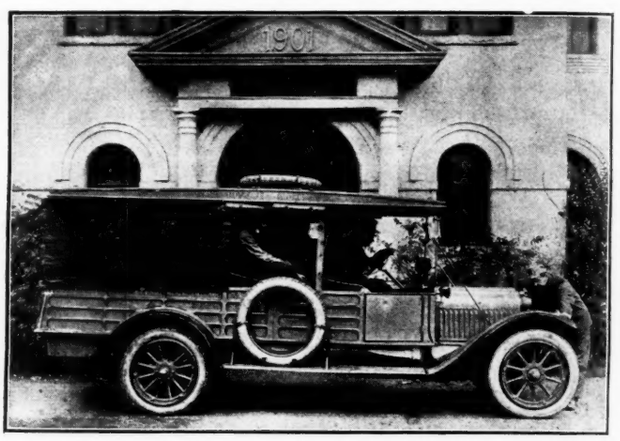
New Federal Mine-Rescue Station

The United States Bureau of Mines mine-rescue station, situated on the campus of the University of Washington at Seattle, was established in 1910. During the first six months of its existence, the cost of conducting it was paid by the coal-mine operators of the state. By an arrangement with the Bureau of Mines, H. M. Wolflin, of the Bureau's staff, was made engineer in charge. At the end of six months the station was taken over by the Bureau, and it has ever since been operated under Federal auspices. For the greater part of the time J. J. Corey has been in charge, although for about two years Mr. Corey was furloughed to the State Coal-Mine Inspection staff, so that he might become familiar with the coal mines in the State. During a period of nearly seven years that has elapsed since the station was opened, about 500 men have received the usual course of instruction in first aid to the injured, and 401 have taken the prescribed course of training in mine-rescue work. Of this total some 75 to 80 were trained by officials with the Bureau railway car No. 5, from Billings, Mont., which was twice brought into Washington on trips to mining districts.

In general those taking the training courses were either coal-mine officials or employees, or were mining students at the University College of Mines. It is now the rule that all University mining engineering students shall take the training course at the mine-rescue station before graduating.

When the station was opened, its comparatively small equipment included three sets of oxygen-breathing apparatus; today it has 21 sets, complete, two of these being the property of the state and the remainder belonging to the Bureau of Mines. There are also three resuscitating devices and a lamp-testing gallery. Of course, there is a roomy smoke chamber in which the practical work that is part of the mine-rescue course is performed. In connection with the first-aid instruction, there is a complete first-aid equipment, with stretchers, etc.; also a surgeon's emergency chest for the use of surgeons only should the occasion for their services arise.

Quite recently there was added to the equipment of the Seattle station mine-rescue motor truck No. 3, this being the third motor truck the Bureau of Mines has supplied to its stations, No. 1 being at Birmingham, Ala., and



MOTOR TRUCK NO. 3 AT SEATTLE RESCUE STATION

No. 2 at Pittsburgh, Penn. The truck was made by the White Motor Co., of Cleveland, Ohio, the body being specially designed by officials of the Bureau of Mines and so arranged as to carry a complete equipment of mine-rescue and first-aid apparatus and appliances, ample supplies and a crew of five mine-rescue men.

The use of the motor truck enables the rescue men of the station to proceed without delay when notice is received at the station that a serious mine accident or disaster has occurred. Without it there was always a risk of delay, which might absorb as much as three or four hours. Often it was impossible to secure a transfer wagon

VIEWS OF RESCUE STATION AT SEATTLE, ITS NEW MOTOR TRUCK AND THE RESCUE CREW

J. J. Corey, in charge of station, is seen on left of right illustration, with electric flash lamp and canary cage in hand

at short notice to take the apparatus and supplies to the railway. Now the materials and the men can be dispatched in a short time, and with the 45-hp. engine and an emergency speed up to 50 mi. an hour, the motor truck will greatly expedite the movements of a rescue crew, possibly enabling lives to be saved which even another hour's delay would have caused to be lost.

The accompanying illustrations show the truck being loaded with chests containing the oxygen-breathing apparatus and the necessary supplies, the latter including five tanks of oxygen and a number of packages or flasks of potash. An oxygen-recharging pump is provided for transferring oxygen from tanks in the rear of the truck to the small cylinders forming part of the apparatus that the rescue men carry. Connection between the motor engine and the recharging pump is made by a clutch, thus providing for pumping by power instead of by hand, using the engine for this purpose after disconnecting it from the traveling mechanism.

A further advantage gained by the possession of this motor truck is that it provides a traveling outfit available for training purposes and thus affords facilities for giving instruction at mines, especially where these are not conveniently accessible by railway yet have good wagon-road connection.

Colorado Mines Grow Safer

The safety of the coal mines of Colorado in 1916 measured up well with the safety in other states. This was partly due, of course, to their freedom from the larger catastrophes. There were only 44 fatalities, a record not duplicated since 1903, at which time there was precisely the same fatality record. The loss of life amounted to 3.55 per 1000 men, a rate less than that of the same state or of Montana, New Mexico, Virginia, Washington and West Virginia in the year 1915.

In 1910 Colorado had four distressing accidents—Primero, when 75 persons were killed; Starkville, which took 56 lives; Delagua, in which 79 fatalities occurred, and Leyden, in which 10 men were suffocated. In that year 323 men were killed in the Colorado mines, but the figures were unusually large, for during the next year the record dropped to 88, to rise the year after to 96 and in the following year to 108.

Of the 44 fatalities in 1916, 12 were due directly to the victims' carelessness, 18 to unavoidable causes, five to carelessness of owners or operators, three to joint carelessness of owners and miners and one to the carelessness of a coworker. The remaining five fatalities are unclassified as to responsibility. At Marshall, Superior and Louisville the operators are trying to reduce the death rate by education; arithmetic, English and Spanish being taught.

Harlan Coal Mining Co.'s Hospital and Bathhouse

The Harlan Coal Mining Co. has a substantial hospital at Harlan, Ky. It was erected in 1912 at a cost of $15,000. Fig. 1 shows the exterior of the building and Fig. 2 the women's ward. The hospital was opened shortly after the company began the development of its property in the Harlan County field. It is open to sick and injured mine workers and their families in the employ of the company and to the general public in that section. It is the first modern hospital erected in that part of Kentucky. Fig. 3 shows the company's bathhouse at Coxton, Ky. The company has put electric lights and many of the conveniences of city homes in the houses of the mine workers.

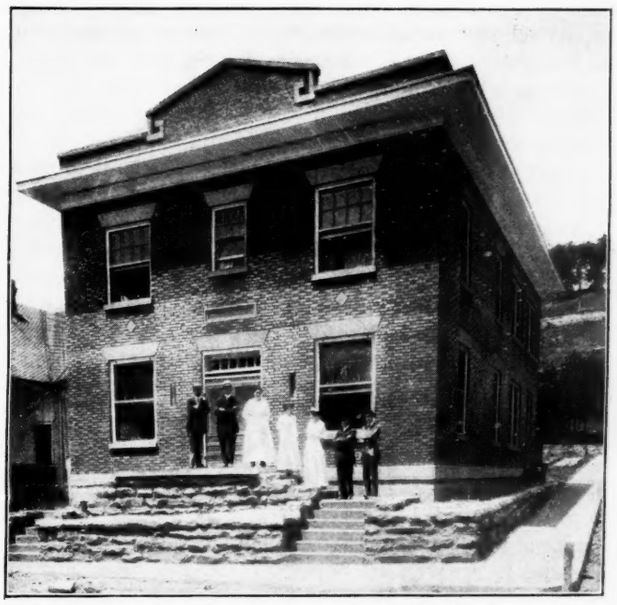


FIG. 1. MINERS' HOSPITAL AT HARLAN, KY.

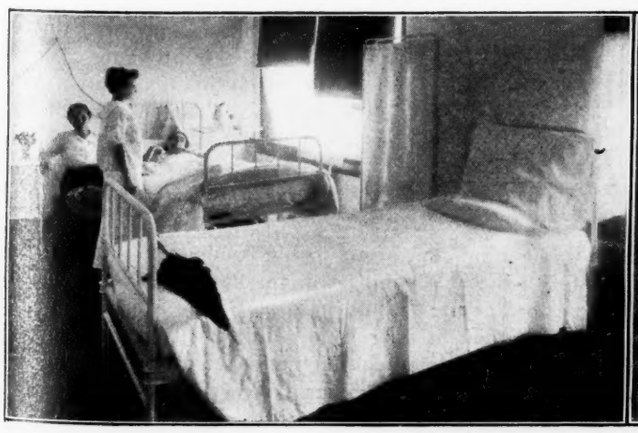


FIG. 2. WOMEN'S WARD IN HARLAN HOSPITAL

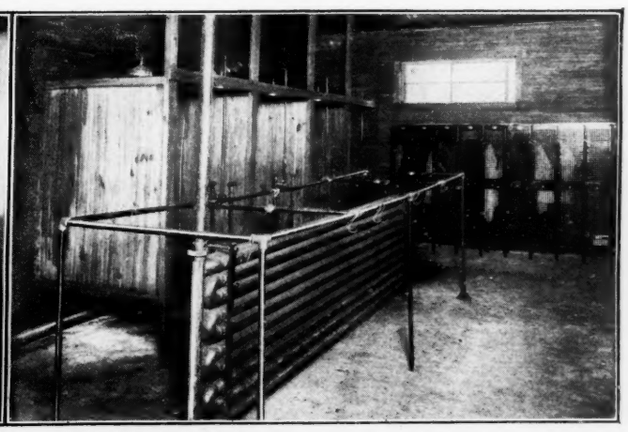


FIG. 3. HARLAN COAL MINING CO.'S BATHHOUSE

Discussion by Readers

Cleaning Up a Roof Fall

Letter No. 6—The inquiry of "Miner," in regard to the instructions that should be given a timberman when he is sent to clean up a roof fall, *Coal Age*, Jan. 20, p. 165, reminds me of a fireboss who had, on a certain occasion, discovered a small fall of slate on a busy haulage road and had it quickly cleaned from the track by one or two men that were near at hand. Later, he asked me if he should report the fact on the record book. In reply, I gave him to understand that as no one had been hurt the danger was past, adding that I was not afraid of slate that had fallen; it was the loose pieces still hanging that were dangerous.

While I willingly admit that the assistant foreman mentioned in this inquiry should have given the necessary instructions to the timberman when sending him to clean up the fall, in order to comply with the mine law, it is surely true that self-preservation should have caused the timberman to use a little horse sense and examine the roof carefully and make it secure before starting to clean up the fall.

Difficulties That Beset Mine Foremen

We have all read of mine foremen and mine foremen, assistant foremen and assistant foremen, firebosses and firebosses; and, almost without exception, they are described as careful and experienced men until something happens that shows their true character. But, no foreman can be in more than one place at one time, and his efficiency is largely determined by the thoroughness with which he has trained the men in his charge. In the instance mentioned, the timberman was either not experienced or he did not use sound judgment and take proper precaution against accident.

Before criticising mine officials too severely, we should consider the economic phases of the question. For example, a fall on a road must be cleaned away as quickly as possible. Two or three drivers or a motorman may be held inside of the fall. The timberman sent to clear the way may be an ordinarily careful and experienced workman; but, to expedite matters, he may take some risk, which is not uncommon in daily mining practice. It is these conditions that should moderate our judgment, although we must allow that "safety first" is always the first consideration.

R. W. Lightburn.

West Leisenring, Penn.

Letter No. 7—Being a timberman, myself, I may say when the mine boss notifies me of a fall in my section of the mine he says nothing in regard to making myself safe. He simply tells me to clean up the place. In regard to the instance cited by "Miner," *Coal Age*, Jan. 20, p. 165, I am not inclined to find fault with the assistant foreman because he did not instruct the timberman to take necessary precautions.

The work of cleaning up a fall is, to my mind, particularly dangerous when the workman must stand under the edge or brow of the fall. My custom is to take down any hanging pieces that it does not appear wise to attempt to support. This is the first thing to be done after making a careful examination of the place.

In some cases, it is the better plan to clean up the fall before timbering the place, but this will depend wholly on the nature of the roof and its condition. In most instances, however, it will be necessary for a man to set one or more posts, temporarily, to protect himself if he must stand under the edge of the cave.

A mine boss or foreman generally expects an experienced timberman to take all necessary precautions for his own safety and that of others and to use his best judgment. While it is true that a competent timberman will be caught, at times, the large majority of accidents of this kind are due to carelessness or the taking of too much risk.

W. H. Luxton.

Linton, Ind.

Circulation in the Wolf Lamp

Letter No. 1—In reference to the inquiry regarding the circulation within a Wolf safety lamp, *Coal Age*, Jan. 20, p. 165, kindly permit me to suggest that the inquirer apply the practical test to this lamp, by exposing it to the smoke produced by smoldering brown paper or tobacco, and watch the result.

Such a test will generally show that much of the smoke surrounding the lamp enters with the air through the openings in the lower part of the bonnet. The observer will probably see the smoke circle downward to the flame, within the combustion chamber of the lamp. Some little smoke will also be observed to pass in through the openings beneath the glass. These openings in the ring gauze, however, are comparatively small and so obstructed by the gauze that much of the air supplied to the combustion chamber must enter the lamp through the lower portion of the bonnet.

Again, it seems to me a mistake to describe the entrance of the feed air into the combustion chamber of a safety lamp, at a point below the flame, as the "Eloin principle." If my knowledge is correct, the oldest lamp admitting its air supply below the level of the lamp flame was the Stephenson lamp. However, in my opinion, only a small percentage of the air supplied to the combustion chamber in a Wolf lamp enters through the ring gauze below the flame.

James Ashworth.

Vancouver, B. C.

[The admission of air to the combustion chamber of a safety lamp at a point below the flame has been generally described as the "Eloin principle." The Stephenson lamp was designed, it is true, to admit the feed air below the flame, but the lamp chimney was constructed in a manner to confine much of the burnt air and extinctive gases in the upper portion of the lamp, in the expectation of safeguarding that portion of the lamp against the trans-

mission of flame. This was the principle, or chief characteristic, of the Stephenson lamp. The feed air was made to enter the lamp through a small tube in the bottom, which was an essentially different construction from that employed in the Eloin lamp, where the air was admitted to the combustion chamber through gauze-protected openings, at a point below the flame. The amount of air entering the Wolf lamp below the flame will vary with the lamp used and the condition in which it is kept. (See "Mine Gases and Explosions"—Beard, pp. 219, 228, 231, 239.)—Editor.]

Electric Substations in Mines

Letter No. 2—The location of a substation at the mouth of a mine is the most inefficient place for the distribution of power in the workings. It not only requires a maximum investment for conductors, but gives the least satisfactory results; and these grow worse as time goes on and the underground workings are extended.

On the other hand, when a substation is located underground it can be so centralized as to prove of great advantage in the distribution of power and, as the mine is developed, the location of the station can be moved forward to a position that will be better adapted to the requirements of the work.

Unfortunately, however, the location of a substation underground is open to a number of serious objections. The most important of these is the danger it introduces in the mine, since it cannot be denied that there is a certain hazard to life in an underground location.

There are other less important considerations that must also be taken into account, such as the natural dampness, acidity and dirty condition involved in an underground station. The cost of construction is somewhat greater than on the surface, while the cost of maintenance of the equipment will far exceed what would be entailed above ground. This last item is largely due to the inability to secure the same careful attention to underground equipment, which results in its more rapid deterioration.

Mine Safety the First Consideration

All things considered, an underground location would generally be chosen in preference to one on the surface were it not that one hesitates to place the safety of those working in the mine in the hands of men who do not always realize their full responsibilities. For this reason, better, more efficient and flexible distribution must be sacrificed, because of the possible danger involved.

The location of a substation in a main intake airway, where a current of fresh air is continually passing, should be safe as long as the ventilating current is not interrupted. There is no absolute assurance, however, that one can depend on such a condition in the operation of a mine. Hence, when locating a substation underground, it should always be designed to meet conditions that may arise from the air being charged with gas and dust.

Where it is necessary to handle alternating current and transform from 2200 volts to a workable voltage, for distribution in the mine, the problem is comparatively simple, as all apparatus is then totally inclosed and made explosion proof. It is a very different matter, however, where it is necessary to convert alternating current into direct current. In that case difficulties begin to multiply and the cost of overcoming them increases.

In all underground electrical work fire hazard is always present, owing to the leakage of current or a rush of current due to a cable breakdown or arcing, sparking of wires, etc. Hence, the necessity of careful installation of reliable apparatus, thorough upkeep and rigid inspection at regular and frequent intervals. Dampness and acid are the arch enemies of all electrical equipment, and these troubles are the most common and the hardest to overcome in underground maintenance. Another important consideration is that of heat losses, which amount to 1 kw. for each 57 B.t.u. per min.

An underground substation should be inclosed but well ventilated, so as to prevent the formation of air pockets or stagnant air. It is important that the air supplied to a substation be clean, particularly if rotating apparatus is employed, as dust and dirt play havoc in the bearings and oiling system. Also, the station must be made as damp-proof as possible.

Three-Phase vs. Three Single-Phase Transformers

In an alternating-current station the question of installing a three-phase transformer or three single-phase units is largely a matter of necessary room. There should always be provided spare transforming capacity, whichever type of unit is employed. The first cost of a three-phase transformer is lower and it occupies less space than three units of equal capacity, besides being easier to install and make explosion proof. But a three-phase unit must be installed in duplicate in order to provide spare transforming capacity; whereas, if three single-phase units are used, one of these would probably suffice. The three-phase unit, therefore, means a greater investment in apparatus, for the same service. The use of single-phase units, also, has the advantage that the spare unit may be connected to any one of the three phases to take the place of a unit in trouble.

It is common practice to carry a high-tension cable supplying the underground substation down through a bore-hole. A three-conductor cable should be used and this should be covered with lead so as to give a high factor of safety of insulation to avoid breakdowns, which are expensive and difficult to repair.

It may prove economy in the end to use a lead-covered steel-armored cable, the sheath of lead being preferably covered with a wrapping of steel. The steel armor not only protects the lead sheath from injury but tends to prevent corrosion. Also it has the further advantage of preventing the clamp used to support the cable in the shaft from injuring the lead sheath.

Supporting Heavy Cable in Shaft

The heavy armored cable is supported in a shaft by clamping it at intervals of 25 or 30 ft. to a steel messenger cable. Such a support is necessary in order to prevent the lead sheath from being unduly strained by the weight of the hanging cable. To guard against fire risk from cable failure, it is important to ground both ends of the messenger cable and the lead sheath. If the cable is very long, the grounding should also be done at intermediate intervals.

The efficiency of a substation and the operation of the mine depend alike upon the reliability of the cable conductors. It is therefore advisable to use a cable having a capacity of 6000 volts for a 2200-volt service, which will increase the factor of safety from 2 to 10. It may be ad-

visable to employ two transmission cables to avoid the possibility of a shutdown in case of cable failure.

In addition to the oil switch underground another switch should be installed at the surface that will enable the current to be shut off in any emergency. The substation should be connected with the surface by telephone. It would seem unnecessary to state that the mine ventilating fan should be operated independently, so that there can be no interruption of the air supply in the mine, caused by trouble in the substation.

The attendance on a substation depends so much on the size of the mine and the capacity of the station, that little can be said in this regard. Responsibility must be placed on men competent to contend with abnormal conditions. All apparatus should be as simple as possible, without sacrificing flexibility. Automatic control possesses advantages that should be carefully considered.

Chicago, Ill. KAPPA.

Checking In-and-Out System in Mines

Letter No. 6—The system we employ for checking the men going in and coming out of the mine is quite similar to that described in Letter No. 1, *Coal Age*, Feb. 3, p. 246. Like the case there mentioned, our mines are gaseous and worked with locked safety lamps. The system has proved very simple and effective.

Each man working underground carries his own lamp, to which is securely fastened a small brass tag stamped with his check number. He has a duplicate check, which he must carry and deposit with the lampman when taking out his lamp, the check being returned to him when he brings back the lamp at the close of the shift.

As described in Letter No. 1, the lampman hangs the checks he takes from the men on their proper hooks on the board. Any check remaining on the board after the men should have all come out of the mine calls for an immediate investigation. It is quickly ascertained where the man lives, and if he is not found at home a search is made for him in his working place in the mine.

A small fee is sometimes charged to pay the searchers for their trouble, but this is not always put in force, although, in my opinion, it is a good regulation. The location of the place in which each man works in the mine and his residence is kept in a book, in the lamphouse, where it is always ready for reference when needed.

West Leisenring, Penn. R. W. LIGHTBURN.

Letter No. 7—We have a system of our own for checking the men in and out of the mine that has worked out remarkably well. I believe it is applicable to either large or small mines.

The checking board is placed at some convenient point on the surface where the men must pass on their way to and from work. The board is supplied with hooks numbered consecutively from one up. Each man is given a check number, his registry number being the same as his loading check. The miner carries these checks on a hook attached to his belt.

Our system differs slightly from that in general use in the fact that each man, when passing into the mine, takes his check from the hook on the board and, again, when coming out of the mine, hangs it on the board in its proper place. Each man working in the mine is registered, under his check number, in a book that the mine foreman carries with him. The book shows where the man is working.

If the foreman desires, he can write the name and location of each man on a strong paper tag and hang it on his hook for ready reference. The card system is very convenient where the man is not often changed, as in room or entry work; but, in drawing ribs or stumps, the man changes his location so frequently that the card system gives considerable trouble, and it is then better to use the reference book to locate him.

At quitting time, the mine foreman looks over the board and observes if anyone has failed to register by hanging his check on the hook. If so, he at once looks up his location and starts to find him. GEORGE L. BELL.

Hartranft, Tenn. Mine Foreman.

Mine-Accident Record

Letter No. 9—I want to cite, briefly, a few accidents, that have occurred in mines of the old country.

In one instance, the chargeman (shotlighter) discovered an accumulation of gas in a cavity where the roof had fallen to a height of about 12 ft. above the road. Having cautioned the men working near there to keep away from the place, he proceeded to look for some timber to erect a brattice that would deflect the air into the hole so as to sweep away the gas.

Shortly after he was gone, one of the men lowered three hutches (cars), which passed under the hole where the gas had accumulated. The movement of the cars and the men disturbed the gas, which descended and ignited on their open lights. As a result, there was an explosion that killed one man and seriously burned three others.

On another occasion, three miners were killed in the Francis pit—a Scottish mine. The men are reported as having voluntarily given up matches and cigarettes when entering the safety-lamp area, and the fireman in charge did not think it necessary to search them further. The three men ordinarily worked in a level place and were using Ceag electric lamps. Finding their own place partly blocked, they decided to work that day in an adjoining place running to the rise.

The fireman who examined the mine before the men went to work had found gas accumulated in this place at the head of the pitch; but, not having any material at hand, he had failed to fence off the place to warn men not to enter. In spite of the voluntary giving up of their matches and cigarettes to the fireman, the men had secreted other smoking material in their caps and were smoking when they entered the place going to the rise. The evidences of this were the cigarettes and burnt matches found after the explosion had taken place that cost the men their lives.

In remarking on this accident, the mine inspector stated, "It is incredible that miners will take the risk assumed by these men, but the fact shows the utter disregard of many miners for all regulations designed to promote safety in the mine." The inspector blamed the fireman in charge of that section, for failing to search the men when they entered the place for work.

Another accident, which occurred at the Coneyre No. 25 colliery, in the Midland and Southern division, Scotland, shows a truly lamentable lack of discipline, which is so necessary in all mining operations. This accident occurred before the enactment of the law in England re-

quiring firemen appointed after 1912 to be at least 25 years of age, with few exceptions based on experience.

In the instance I am about to narrate, the fireman was a youth only 18 years of age who had little or no experience in gas, although he held a fireman's certificate. The manager (foreman) only visited the mine during the day and had never seen this youthful fireman, who was employed on the night shift. It was the old story: Gas was ignited in the firing of a shot and the fireman was killed.

The conclusion of those who investigated the accident was that the lad had failed to examine the place before lighting the shot. From the position of the shothole, it was evident that there must have been a considerable accumulation of firedamp in the place. The accident shows either gross negligence or ignorance on the part of the fireman and a great lack of discipline in the management of the mine. SCOT.

Wigan, England.

Letter No. 10—I notice that William Jardine, in his letter, *Coal Age,* Feb. 3, p. 245, lays the blame for the accident I mentioned in my last letter wholly on the miner who drilled and charged the hole, the shotfirer who fired the shot and the mine management for lack of discipline. I want to draw his attention to the laxity of the state mining law and ask how these men can be held responsible for what the law does not require of them.

I heartily indorse the suggestion of Mr. Jardine that "all shotholes should be examined, charged and tamped by the shotfirer, who should be a practical miner and required to pass a rigid examination before being allowed to take up his duties." However, Mr. Jardine has been in and around Clinton for a number of years and is well acquainted with the conditions under which the shotfirers in Indiana mines work today. He knows that the coal operator is powerless to prevent such accidents, under the present arrangements.

Conditions Controlling Shotfiring in Indiana

All miners have a certificate of competency issued to them by a board of examiners. The shotfirers are hired, paid and discharged at the option of the miners, who are taxed a fee of $1 to pay for the firing of their shots. The matter being thus in the hands of the mining locals, the companies are apparently relieved of the responsibility for accidents that may occur.

The mine in which this accident took place is supervised by a good practical man who has held the position of mine boss for 10 years. But, I would like to ask, how would this man have any authority or control of the shotfirers in the performance of their work, since they are hired and are responsible only to the miners by whom they are paid?

Mr. Jardine's experience will enable him to know that the average miner thinks or cares little for the life of the shotfirer who must fire his shots. He is controlled by the fixed idea that the more powder he can put in a hole the more coal will be blown down and ready to load. There are, of course, some experienced miners who are not so thoughtless of the safety of others, but they are comparatively few in number.

Until a state law is passed that will change these conditions and fix the responsibility for the charging and firing of holes in blasting coal and rock in the mine, the mine management cannot be held responsible for the manner in which this work is done and its results.

In closing, I want to briefly state what Mr. Jardine already knows, that it is a common thing for the shotfirers in Indiana to enter a mine and fire all the shots in 1½ hr., while it takes a fireboss fully 4 hr. to complete his examination of the same working places.

Wrong Method of Firing Shots

Again, it is true that the two shotfirers, as I stated previously, were advancing with the air, instead of against the air current, as required in most mining laws and is the only safe practice in firing shots in mines. I am glad to say that there is a revision of the Indiana mining laws now under consideration by the state senate, and we are hoping for its early adoption.

Coal Age will bear me out in the statement that the limiting charge of powder, given as "8 lb." in my previous letter, was not my mistake but a typographical error. The charge limit required by the Indiana mining law is 6 lb. of powder in a single hole. TIM GOLDON.

Clinton, Ind.

Textbooks in Examination

Letter No. 14—I have been interested in the question raised of examining boards permitting the use of textbooks by candidates in examination. I notice that there is quite a difference of opinion in this regard, but I am one that does not favor the practice.

As is well known, a mine foreman has a great many things he must think about and remember in the management of a mine. He must be able to carry these things in his head, keep them on his mind and attend to them at the proper time. I believe that the foreman who has such a poor memory that he cannot remember a few simple formulas, in regard to ventilation, pumping, timbering, etc., would make a poor man to manage a mine. I have only passed two examinations, myself, but have looked over the questions asked on such occasions a great many times, and have yet to find a single question that could not be answered correctly by using a simple formula.

In my opinion, if candidates are to be allowed the use of textbooks when being examined, there is no reason why they should not be permitted to look into copies of the state mining law. Many mine foremen carry a copy of the mining law about with them in the mine and refer to it frequently. But, a candidate is obliged to know the mining law from cover to cover, in order to pass a good examination.

There is another side to this question, however, and it is this: A man with a textbook full of formulas at his elbow would have little trouble in answering any question that might be asked and, with a little practical experience of most any kind, he would have slight difficulty in passing the examination and getting his certificate.

The result of this would be that there would be so many certified men ready to take the position of mine foreman, that the wages of competent men would be quickly reduced and efficient foremen, who will not work for low wages, would be wanting in the mines in a short time.

Again, I believe that the proposed use of textbooks in examination would lower the efficiency of foremen, since a

man would have to do little studying in order to secure a certificate. One writer speaks of the "high standard" of mining examinations. I fail to see such a high standard maintained by many examining boards, some of which have granted certificates to men who were hardly qualified to dig coal and within four months had their certificates taken from them, owing to their drunken condition and neglect of duties in the mine. Firebosses have been given certificates who have never seen a safety lamp used for testing for gas in a mine. Of course, I do not contend that all examining boards are thus guilty.

In regard to the use of textbooks, inviting dishonest methods by candidates, I want to say that any candidate caught at such practices should be disqualified and his paper refused. In closing, I want to say again that most of the questions asked require only simple formulas and a knowledge of addition, subtraction, multiplication and division of decimals and fractions, and these any good foreman should know. OLIVER YOUNG.

Nu-Mine, Penn.

Recovering a Flooded Mine

Letter No. 3—In connection with the inquiry of T. S. Almond, *Coal Age*, Dec. 30, p. 1101, the following short citation of a somewhat similar operation may be of interest. Had more data been given by Mr. Almond, in respect to the conditions prevailing in the district, a much better judgment might have been formed in regard to the possible or probable conditions of the entries in the flooded mine mentioned.

The instance to which I refer was that of a mine opened in a thin seam of coal, about 18 in. in thickness. The coal was overlaid with a stone roof and rested on a fireclay bottom. The pitch of the seam did not exceed 10 deg., but the formation was broken by three large faults, which ran almost at right angles to the full dip of the seam.

MINE ABANDONED, SHAFT FILLED WITH ASHES

Owing to the high cost of mining, the place was abandoned and the shafts then filled with ashes dumped from the surface. The filling of the shafts naturally left a seal of air, which was prevented from escaping, as the water collected in the mine; and no doubt the rising water caused a considerable increase of air pressure in the workings.

At the time the mine was abandoned, I think the dip workings had advanced some 1500 ft. from the shaft bottom. The roadways would average 5 ft. high and 8 ft. wide and were protected with well built packwalls on either side. Some 10 years later, this mine was reopened, owing to the introduction of cutting machines making it possible to mine thin seams of coal at a profit. The excavation of the ashes from the shaft required almost as much labor as the sinking of a new shaft, but the timbers were found to be in a good state of preservation the full depth of the shaft, 110 ft.

The work of pumping out the water, following the opening of the shafts, was a slow process, because of the large open area of the longwall workings. The roads, however, were found to be almost in the same condition in which they were left, and even the timbers stood quite firm and solid. A few falls had occurred where the roof was weak, but these were inconsiderable.

The worst condition was found at the coal face where the water had worked into the fireclay bottom, which had heaved, making a soft, mushy bottom into which the coal, packs and timbers had sunk. The greatest difficulty was experienced in opening up a fresh working face, for the reason that the balance of pressure, so important in longwall working, had been disturbed. The same condition did not prevail back on the roads, because the overburden rested chiefly on the face of the coal.

WHAT MAY BE EXPECTED AFTER PUMPING OUT THE WATER

Mr. Almond has not stated whether his mine is a room-and-pillar or a longwall working, and has given no suggestion of the extent of the open area from which the coal has been extracted. I judge, however, that the chief difficulty will arise from the action of the water on the fireclay bottom. However, the roof pressure for 125 ft. of cover cannot be great, although it may be sufficient to start a "creep," depending on the plan of working and the percentage of extraction.

Twenty years is a long time for water to stand in a mine, and if creep or squeeze has started it has probably spread to an extent that it could not be controlled, in which case it would be cheaper to start a new mine. The question of squeeze is an important one, and I would suggest that the experience in mines in that locality, in this respect, would be very helpful in deciding on the probable condition of the flooded mine. NOVA.

———, Canada.

Letter No. 4—Referring to the inquiry of T. S. Almond, *Coal Age*, Dec. 30, p. 1101, allow me to say that I would most certainly pump the water out of the flooded mine he mentions, even if I knew that there was only one entry standing in the mine and, particularly, if the present opening presents good shipping facilities, as this is an important item in the operation of a mine.

Judging from the brief description he has given in regard to the extent of the workings and considering the fact that the mine roof was a hard shale, it is quite probable that this has stood fairly well and will be found to be little broken. On the other hand, the coal being underlaid with fireclay, it is possible that the latter will show a tendency to heave when the water has been pumped out. It may even happen that the release of the pressure on the clay bottom will cause audible thuds to be heard while the pumping is proceeding.

If the bottom heaves badly after the water has been pumped from the mine, it will be well to watch the roof slate very carefully, as this may slake and present a condition similar to that of a squeeze, in its local effect, in which case it will be necessary to secure the roof by timbering.

In this connection allow me to suggest that the fireclay that could be taken from this mine might make a paying asset when cleaning up the workings. I have known several such instances. If the clay cannot be marketed at once, it should be stocked in a pile by itself, in a place convenient for shipping.

I recall the case of a forced sale of a coal mine and all its equipment, including a large pile of fireclay, which brought £10,000 sterling in the sale. As is well known, a good fireclay is an important factor in many industries.

West Leisenring, Penn. ROBERT W. LIGHTBURN.

Inquiries of General Interest

Drawbar Pull vs. Track Resistance

The inquiry of Charles Rodenbush and the editorial reply, *Coal Age,* Feb. 3, p. 247, interested me greatly, because I had occasion recently to estimate the load that a certain type of gasoline locomotive would pull.

Upon inquiry I was informed that it was necessary, first, to calculate the drawbar pull, which would enable me to estimate the load the machine would haul. My informant gave me practically the same rule as that published in *Coal Age* in the reply to which I have referred; namely, under ordinary conditions and on a level track, the drawbar pull would be about one-fifth of the weight of the locomotive.

The weight of the locomotive that I was considering was 6 tons, or 12,000 lb., and I figured that its drawbar pull on a level track would therefore be 12,000 ÷ 5 = 2400 lb. Now being a layman and wholly unfamiliar with technical terms, my natural conclusion was that the drawbar pull at the business end of a locomotive indicated the load the machine would pull. I was therefore greatly surprised to learn that this was not the case, but that it would be necessary to know the frictional resistance of the track and that the grade resistance also must be calculated when the track is inclined. For this information, I was referred to certain tables, giving the track and grade resistances under certain conditions.

To make a long story short, I concluded from a careful study of the tables that I could assume favorable conditions in making my estimate and, for a level track, take the resistance as 10 lb. for each ton, which my informant claimed would make the estimated maximum load hauled when the drawbar pull was 2400 lb., 2400 ÷ 10 = 240 tons, or 480,000 lb.

This result confused me greatly, as I was unable to comprehend how a drawbar pull of 2400 lb. would haul a load of 480,000 lb.; or, in other words, how the load hauled could be 200 times as great as the drawbar pull. I have spent many a restless hour in the effort to recall and properly apply the mathematics I learned several years ago in the classroom. This, however, has been without avail and I want to ask, What is meant by the drawbar pull? Is it the ability of the motor to transmit power to the traction wheels of a locomotive? Also, does the ability of a locomotive to pull a load depend on the drawbar pull and the tractive power of the wheels resting on the track? I shall greatly appreciate having this matter made clear. PERPLEXED.

Chicago, Ill.

There are several distinctly separate factors concerned in locomotive haulage, which may briefly be described as follows:

1. The "tractive effort" of a locomotive is the force exerted by the motor at the circumference of the driving wheels. In a well-designed machine, the power of the motor is such as to equal the greatest adhesion of the wheels to the rails, which adhesion must of necessity limit the possible tractive effort of the machine. This tractive effort, as thus limited by the adhesion of the wheels to the rails, is therefore the force available to move the entire load, including the locomotive and the trip it hauls.

2. The drawbar pull is that portion of the tractive effort that is employed to move the trip attached to the locomotive. Thus the hauling capacity of a locomotive, as represented by the possible drawbar pull, is always less than the maximum tractive effort the locomotive can exert, by an amount equal to the force required to move the locomotive itself.

It should also be clear that the drawbar pull is always equal to the total resistance offered by the trip hauled, whether the locomotive is taxed to its full capacity or not. In other words, the drawbar pull in any event is limited by the resistance of the trip hauled.

3. The "track resistance" is the frictional resistance offered by the entire moving load and is estimated in pounds per ton of load.

4. The "grade resistance" is the gravity pull of a load resting on an inclined track and is equal to the weight of the load multiplied by the percentage of grade expressed decimally. Hence, grade resistance is always 20 lb. per ton for each per cent. of grade, since 2000 lb. equals one ton and 0.01 × 2000 = 20 lb.

The actual drawbar pull, in any case, is equal to the sum of the track resistance and grade resistance of the load hauled. For purposes of estimate, it is common practice to assume the possible drawbar pull as varying from 20 to 30 per cent. of the weight of the locomotive resting on the drivers, according to the condition of the rails and the kind of wheels used. But, the actual drawbar pull must be equal to the total resistance (track and grade resistances) of the cars, which is estimated in pounds per ton of load hauled.

Track resistance, in mining practice, will vary from 20 to 40 lb. per ton, while grade resistance is 20 lb. per ton for each per cent. of grade. Assuming a level road and a track resistance of, say, 25 lb. per ton of load, the load that a 6-ton locomotive will haul on a level track, the drawbar pull being 2400 lb., is 2400 ÷ 25 = 96 tons. The track resistance mentioned by this correspondent (10 lb. per ton of load) is not generally applicable to mining practice, in underground haulage.

For the sake of illustration, let it be required to find the maximum load a 6-ton mine locomotive will haul up a 2½-per-cent. grade, assuming a track resistance of 30 lb. per ton. In this case, the grade resistance is 2½ × 20 = 50 lb. per ton. The track resistance being 30 lb. per ton makes the total resistance of the load hauled 50 + 30 = 80 lb. per ton. Then, taking the drawbar pull as approximately one-fifth of the weight of the locomotive, or ⅕(6 × 2000) = 2400 lb., the maximum load this locomotive will haul on such a grade is 2400 ÷ 80 = 30 tons.

Examination Questions

Miscellaneous Questions

(*Answered by Request*)

Ques.—What are the advantages derived from having a safety lamp shielded?

Ans.—By the "shield" of a safety lamp is generally understood a metal shield attached to a lamp whose gauze is unprotected by a bonnet. The unbonneted Davy lamp, so commonly used by firebosses in testing for gas, is generally and should be always protected by such a shield, which is a piece of metal partially surrounding the gauze chimney of the lamp. In lamps of the Clanny type, the gauze surmounting the glass is commonly protected by a bonnet when protection is required. The purpose of the shield on the Davy is to protect the lamp from a sudden rush of air that might force the flame through the gauze.

The advantage derived by the shield is the protection that it affords against strong air currents, without obstructing the light cast by the lamp in the opposite direction. The shield also serves as a reflector and increases the illuminating power of the lamp, which is greatly to be desired by the fireboss in making an examination of the mine.

Ques.—In what way is blasting dangerous in a mine giving off marsh gas? Explain fully.

Ans.—The explosion of a charge of powder, in blasting coal or rock, is always accompanied with more or less flame, which would ignite any gas that might be accumulated in the place where the shot is fired. Where marsh gas is given off at the face of a working place in which blasting is performed, a careful examination for gas should be made before any shot is fired therein.

The danger is greatly increased when the examination for gas is carelessly made, or when an overcharge of powder is placed in the hole, or when the charge is improperly located so that the powder cannot properly do its work in breaking down the coal. An overcharge of powder, or the drilling of a hole so that the line of least resistance practically corresponds with the axis of the hole, is sure to produce a windy or blownout shot, with the result that much dust is blown into the air and subjected to the action of the flame of the blast, thereby producing a local dust explosion. If gas is present under these conditions, there is almost sure to result a propagation of the explosive blast throughout the mine.

Ques.—When should a current of air passing in a mine, or any section of a mine, be considered as a return current?

Ans.—If the mine is ventilated by a single current of air, that portion of the current from the intake to the last inby crosscut or breakthrough is properly the "intake," while the remaining portion of the current from such breakthrough to the discharge opening of the mine is the "return current."

Where such a single current passes continuously through two or more pairs of cross-entries turned on both sides of the main headings, it would be more proper to speak of the "intake side" and the "return side" of the mine. But, the air current passing in to the face of each pair of cross-entries is the intake for those entries, while the air passing out from the face of the entries to the main heading again, is the return of that section.

The same is true of any section or division of the mine ventilated by separate air splits. The current passing into such section, from the mouth of the entries turned off the main heading, to the last inby crosscut, is the intake for that section; and the air passing out is the return for the same section.

Ques.—What conditions would guide you in determining the width of headings and rooms?

Ans.—The chief factors that determine the width of mine openings are the nature of the roof and floor; the thickness, inclination and hardness of the coal seam; thickness of cover or depth of seam below the surface; the presence of slips or fault lines in the roof and well pronounced cleats in the coal; the method of working and length of time the openings are to be maintained; the presence of water or gas in the seam, roof or floor; and, finally, the kind of haulage employed in the mine. All of these factors should be carefully considered in determining the width of opening.

The width of rooms must always be considered, however, in connection with the width of pillar to be left between them. Under some conditions, it is necessary to drive narrow rooms or stalls separated by wide pillars, while other conditions will permit the driving of wide openings with less pillar support. Experience in each locality is the surest guide to follow.

Ques.—What are the causes of falls of roof and how would you make an inspection to determine the security of a roof in a mine?

Ans.—The immediate cause of roof falls, in coal mining, is the extraction of the coal without affording sufficient support to the roof. Maintaining too large an open area in any section of the mine induces creep or squeeze, which in turn crushes the pillar coal and causes heavy falls of roof in the openings. Fault lines and slips in the roof are a frequent cause of dangerous falls.

In order to determine the security of the roof, in a working place in a mine, it is necessary to carefully inspect the surroundings. Note particularly the condition of the supporting timbers and observe closely what effect the roof pressure is producing on the pillars supporting the roof over the openings. Study well the character of the roof slate and watch closely for any slips or fault lines.

In addition to this, the roof slate should be sounded to detect any hollowness, which would indicate a separation of the slate immediately over the coal from the more solid formation above. Too much reliance, however, must not be placed on sounding the roof, which does not always reveal an unsafe condition. Greater dependence must be placed on a careful inspection of its condition and that of the supporting timbers and pillars, guided by a knowledge of the roof action gained by experience.

Coal and Coke News

Washington, D. C.

Shippers of coal to Chicago and Chicago switching districts are threatened with an increased freight charge in that territory. In view of the car shortage agitation and the recent decision of the Interstate Commerce Commission, a rule has been proposed reading as follows:

"On foreign per diem cars handled under this tariff, loaded or reconsigned within the Chicago, Milwaukee & St. Paul R.R. Switching District for points on connecting lines, except the home road, within the Chicago Switching District, $3.75 will be added to the regular switching charge to cover reclaim of per diem expense to the Chicago, Milwaukee & St. Paul R.R."

The present charge of $2.25 per car on foreign per diem cars to be added to the regular switching charge. The Commission suspended the proposed increase until June 15 next, and in the meantime will conduct an investigation into its reasonableness.

Complaints are Still Heard

Complaints against the distribution of coal cars by the railroads during the shortage are still being filed with the Interstate Commerce Commission. Another has just been brought by the Northern Coal Co. of St. Louis, Mo., which is engaged in mining bituminous coal at Millstadt on the line of the Mobile & Ohio R.R. It was claimed that this mine has a capacity of 500 tons a day and that proper demands were filed with the railroad for the cars in advance in accordance with the rules of the road, but that the carrier failed to distribute the cars "in accordance with its legal duty," and had preferred mines located on the St. Louis Division of that road.

The complainant declared that during the period of shortage the mine received cars for a tonnage of approximately only 22,000 tons while it should have received cars for a tonnage of over 85,000 tons, had the cars been properly distributed. The petition filed with the Commission stated:

"Your complainant was prepared to sell and had a market for all of the coal had cars been furnished during said period; and that by reason of the failure of the Mobile & Ohio due to the aforesaid discriminations, to furnish unto your complainant during the said period, the said cars for the said tonnage to which it was thus entitled your complainant was unable to meet its business requirements and was subjected to great loss on the profits it would have received on the coal, it was thus prevented from mining, shipping and selling and for all of which it had a profitable market, and additional great losses because of the increased cost of production and losses necessarily attendant upon the operation of its property due to the reduction of its output resulting from its failure to receive the equipment it was thus entitled to; to the damage of complainant of $51,220 for which it claims reparation herein."

HARRISBURG, PENN.

A bill for the creation of 25 assistant mine inspectors in the Department of Mines, for the anthracite region, was presented in the House on Feb. 5, by Representative David Fowler, who is also a member of the tri-district Board of the United Mine Workers. The measure is sponsored by the three district boards of the United Mine Workers and provides for the election of these officials, who are to receive $2000 a year.

Eligibility of candidates for election will be passed upon by a board of examiners appointed by the courts of Luzerne, Lackawanna and Schuylkill counties. The examining board is to consist of one mine foreman and two miners and an average of 75 per cent. on all questions in the test will be considered satisfactory.

A similar bill, except for the appointment of the examining board, was passed during the 1915 session, and was vetoed by the Governor on the ground that the bill made an insufficient appropriation.

The United Mine Workers declare that assistant mine inspectors are needed to safeguard ventilation and to improve working conditions. At the present time there are 25 inspectors in the hard coal field, with an average of 5000 employees inside the mines for each inspection district, and in the soft coal district there are 30 inspectors with an average of 5200 employees inside under the supervision of each inspector. While in foreign countries as high as 25,000 men are employed under the supervision of one government mine inspector.

Why the mine workers are asking that assistant mine inspectors be placed in the anthracite region, where the number of men under the supervision of a mine inspector is less than in the bituminous region, is being asked by the members of the House from the soft coal counties. It is stated that unless the bill is amended to include assistant inspectors for the bituminous coal district, opposition to the bill will come from the representatives from the western part of the state.

The bill follows along the lines of the Act of 1891, but makes the assistant inspectors practically responsible to no superior officer, and reads in part as follows:

Sec. 1. That on and after the passage of this act there shall be created in this Commonwealth the position of assistant mine inspector to be distributed in the various inspection districts of the anthracite coal field. . . .

Sec. 2. The person who shall fill the position of assistant mine inspector must be a citizen of Pennsylvania, and have attained the age of 25 years. He must have had five years' experience working in the anthracite coal mines of this comonwealth, and have passed an examination before an examining board as hereinafter provided.

Sec. 3. The assistant mine inspector shall see that the laws relative to ventilation in anthracite coal mines are obeyed and he shall pay particular attention to the circulation of air at all working faces where men are employed and he shall have the right and it is hereby be made his duty to enter, inspect and examine any mine or colliery in his district relative to ventilation and the workings and machinery belonging thereto at all reasonable times . . . and shall make a report on or before the 15th day of each month to the chief of the Department of Mines at Harrisburg, of the inspection made by him. . . .

Sec. 4. The salary of the said assistant mine inspector shall be $2000 per annum, which salary together with expenses incurred in carrying into effect the provisions of this act shall be paid by the state treasury. . . .

Sec. 5. In case an assistant mine inspector becomes incapacitated to perform the duties of his office for a longer period than two weeks it shall be the duty of the judges of the Courts of Common Pleas who preside in the inspection district to deputize some competent person who must have the qualifications of an assistant mine inspector to fill the office. . . .

Sec. 6. Provides for the filing of certificates, etc.

Sec. 7. Each inspector is to hold office for the term of four years from the first Monday of January, immediately succeeding his election.

Sec. 8. Provides for the election of the assistant inspectors at the general election.

Sec. 9. After the passage of this act the judges of the courts in the various inspection districts shall appoint qualified persons to act as assistant mine inspectors, said inspectors to be duly qualified by the examining board and to serve until the first Monday of January, 1918, or until their successors are duly elected and qualified.

Sec. 13. Provides that on a petition signed by 50 coal miners or 10 operators, setting forth that an assistant mine inspector has neglected his duty, the court is given power to remove him, if found guilty of malfeasance in office.

Sec. 15. The board to examine assistant mine inspectors shall be composed of two reputable coal miners and one mine foreman in actual practice at the date of their appointment. . . .

Sec. 16. The said Board of Examiners shall hold at least one examination each year, which examination is to take place in the month of March or soon thereafter. . . .

Sec. 18. The said Board of Examiners shall grant certificates to all applicants who appear before them and answer 75 per cent. of the questions they were asked, who are otherwise qualified as hereinbefore mentioned. No certificate granted to an assistant mine inspector shall be legal unless signed by at least two members of the Board of Examiners.

Sec. 19. Assistant mine inspectors appointed or elected under the provisions of this act shall be assigned territory in which to perform services by the chief of the Department of Mines, and the assistant mine inspector, after he is assigned such territory, shall see that the laws relative to ventilation in anthracite coal mines are obeyed in his bailiwick.

Motor Ambulances Must be Furnished

A bill to amend secs. 1, 2, 3, 4, 5, 6 and 7 of Art. 7 of an act approved June 2, 1891, has been introduced in the House by Mr. Donnelly.

The bill provides for motor ambulances and requires them to be furnished free of charge with registration certificates and number tags.

Sec. 1 has been amended to read "The owner, operator or superintendent of every mine or colliery, except as hereinafter provided shall provide and keep at such mine or colliery a motor ambulance, and also at least two stretchers for the purpose of conveying to their places of abode any person or persons who may be injured while in the discharge of his or their work at such mine or colliery."

Secs. 2, 3, 4, and 6 are changed to read "motor ambulance."

Sec. 5 provides . . . "that where two or more mines or collieries are located within 2 mi. of each other or motor ambulance is located within 2 mi. of each colliery, but one motor ambulance as aforesaid, shall be required if the said mines or collieries have ready and quick means of communication, one with the other by telegraph or telephone."

Sec. 7 states that "there shall be furnished free of charge by the State Highway Department a registration certificate and two number tags for every such motor ambulance."

Amendment to the Code is Asked

An amendment to sec. 1, of art. 8 of the bituminous code of 1911, is asked for in a bill introduced in the house by Lee Smith. This bill asks that the second paragraph of the section be changed to read as follows:

"The operator or the superintendent shall provide every cage used for lowering or hoisting persons with hand rails at sides or over head and with chain, bar or gate at ends and with sufficient covering over head to protect person thereon and shall also provide for each said cage efficient safety catches which shall be tested once every two months and a record of each test shall be sent to the inspector and to the superintendent and also recorded with red ink in a book kept at the mine office for that purpose. Mine inspectors shall have power to compel the adoption of such safety and locking devices on cages used in lowering and hoisting persons as will prevent the accidental tipping of cages. The ropes shall be securely attached to the side of the drum of every machine that is used for lowering and hoisting persons or materials into and out of the mine and the flanges shall have a clearance of not less than 4 in. when the whole of the rope is wound on the drum and adequate brakes shall be attached to the drum so that the speed thereof can be controlled when men are being lowered or hoisted. An efficient indicator that shall show the position of the cages in the shaft shall be attached to the hoisting apparatus and an efficient safety device that will prevent overwinding shall be attached to every engine used for lowering and hoisting persons.

PENNSYLVANIA

Anthracite

Franklin Junction—The engine and boiler house on the Lehigh & Wilkes-Barre Coal Co.'s culm bank was destroyed by fire recently. The origin of the blaze is not known. The culm from the company's No. 5 colliery is conveyed to this bank.

Beaver Brook—Unable to secure enough men at home to operate its mines, the C. M. Dodson Coal Co., owning the Beaver Brook, Morea and Locustdale collieries has imported men from points down the Lehigh Valley. The sales offices of this company have been destroyed by fire, entailing a loss of $4000.

Mahonoy City—The fire in the workings of the Primrose mine of the Lehigh Valley Coal Co., is believed to be under control. The fire has been sealed in by concrete walls and is being flooded through bore holes.

Three miners entombed in a gangway of the East Bear Ridge Colliery were removed from the mine on Feb. 9. Although these men had been imprisoned for comparatively a short time, they were all dead when recovered. The body of one man was still warm when the rescuers reached him.

Minersville—The loading of coal in mine wagons at the chutes in the different gangways in the Lytle colliery, which was formerly done by "company men" is now done by contract workers. They load the coal and transport it either to a main turnout or to the shaft bottom, receiving a certain sum per car, from which they pay their drivers, and loaders and supply their explosives. Experienced men who were driver bosses before the change eagerly took up the new method of work and although the plan is new it gives promise of being a success.

Kingston—As an evidence of its policy of encouraging employees to be loyal and if need be, to serve the National Government, the Kingston Coal Co., held a flag raising at its offices on Feb. 7. Simple ceremonies were conducted at the close of the work day and were

witnessed by officials, office employees and men from the mines. This company, by offers of financial assistance, stimulated enlistment when the ranks of the 3rd Field Artillery were being filled and also set at ease the minds of those of its employees who had already enlisted by promising that their dependents would be taken care of. Flags have also been raised in the five playgrounds of the company.

Bituminous

Johnstown—The new mine of the Valley Smokeless Coal Co. at Krings Station will be in operation as soon as the new switch and siding can be placed there by the Baltimore & Ohio R.R.

The annual report of the State Mine Inspector, Thos. B. Williams, of the 6th bituminous district, was recently made public. This shows that 5,023,724 tons of coal were produced in the district in 1916. This is an increase of 423,369 tons over the previous year. Six new mines were opened in the district. The number of fatalities last year exceeded those of the previous 12 months by three.

Rices Landing—It is reported that 242 acres of coal and surface, one-half mile south of Rice's Landing in Greene County, have been sold by Thomas Hartley to the H. C. Frick Coke Co. The negotiations for this field were handled by J. V. Thompson of Uniontown.

Juniata—A meeting to promote mine safety was recently held at this point. Many papers and talks on safety measures and devices were presented at this meeting.

Ellsworth—The Ellsworth Collieries Co. has begun the construction of 20 new houses on the Bentleyville-Bealesville road. The demand for coal and its byproducts has so increased that the Ellsworth company has been unable to house the families of all its employees.

Connellsville—Shipments of coke from the Connellsville region during the week ended Feb. 3 amounted to only 305,000 tons, being a loss of 30,000 tons over the previous week. This loss was due to car shortage and low temperatures. Production also fell off decidedly, operation at some plants being almost impossible. The car supply on some days amounts to only 30% of requirements.

California—A miner in the Vesta No. 4 coal mine near California was recently killed in the mine through fright. This man was found dead almost 18 ft. from a heavy fall of slate. Had the man been caught under the fall he would have been crushed to death. There were, however, no marks on his body, and all the vital organs were found to be in perfect condition. From all available evidence, it was believed that the man died of fright shortly after the fall occurred.

Punxsutawney—The annual report for the 12th bituminous district has just been completed by Inspector Thomas A. Furniss. The production for the year just closed is 5,770,311 tons, an increase over 1915 of 1,461,616 tons. There were 11 fatal accidents compared with 13 in the preceding year. The production by counties is: Jefferson, 2,124,644 tons; Indiana, 1,949,106; Clearfield, 1,696,561.

Indiana—Thomas S. Lowther, Inspector of Mines of the 25th bituminous district has given out some interesting figures in connection with his annual report. The total tonnage for 1916 was 5,581,222 an increase over the production of the district in 1915 of 765,739. There are 5426 men employed. The fatal accidents in the district totaled 49, the large number being due to the greater portion being killed in the explosion in Ernest No. 2 mine last February. The greater portion of Indiana county composes the 25th district.

The Buffalo, Rochester & Pittsburgh Railroad Co. has in view the electrification of its line through Indiana county, work on the plans having begun a few days ago, it was announced. This work will be in addition to the improvements that are being made at the present time between Indiana and Punxsutawney, in the form of double track on several sections, additional yards, etc., to cost $1,000,000. The improvements are made necessary by the rapidly developing Indiana county coal fields.

Ligonier—Seger Brothers of Ligonier, who recently purchased the Foster tract of coal at Hillside and who have already begun the opening of mines, are negotiating for 130 acres more of coal adjoining their present holdings. It is reported that an average price of $1000 per acre has been offered and refused.

Somerset—"Wagon coal shippers," the operators who do not have tipples, held a meeting on Feb. 7 for the purpose of laying plans to carry to the Interstate Commerce Commission their claims that the railroad companies are discriminating in the matter of distributing cars. The car shortage is driving many operators out of business, they claim. Attorneys have been retained by the operators.

Uniontown — Thirty-five persons were made homeless by a fire which destroyed four houses and damaged two others at the plant of the Champion Coal and Coke Co. on Feb. 6. The occupants of the houses escaped. The loss is about $12,000.

WEST VIRGINIA

Charleston—Mine inspectors have issued warnings to all of the miners advising them to be careful during the months of February and March on account of atmospheric conditions. It is a known fact that at this time of year there is great danger of explosions.

Bream—The Penmar mine, formerly owned by Jacob Householder, has been sold to Lebow Bros. Co. of Charleston. Extended improvements will be made by the new owners to increase the present capacity of the new mine.

Bluefield—The Flat-Top Fuel Co. which has hitherto maintained its general sales office with its operating office in Bluefield, has recently established Eastern and Western sales headquarters at Norfolk, Va., and Cincinnati, O., respectively. This change was made in order to enable the company to meet the requirements of its steadily increasing business.

Bad weather conditions and the resultant congestion in shipping facilities have hampered the output of mines in the Pocahontas field, and production has fallen fully 25% below normal. This is, however, a decided improvement over conditions a few days ago, when the cold weather forced many operators to suspend work entirely.

Huntington—Coal operators of Huntington and vicinity are worried over the situation relating to embargoes. These are said to have been tighter within the recent past than at any time previously.

The tipple of the Island Creek Coal Co. burned recently causing a loss of $50,000. This was the largest on the Ohio or Mississippi Rivers. The company had large orders to fill for the Pittsburgh Coal Co. for southern trade. Several boats will be out of commission for some time, or until a new tipple can be built. The cause of the fire is not definitely known, but it is believed by some to have been of incendiary origin.

ALABAMA

Birmingham—About 240 convicts employed by the State of Alabama in mining coal in the mines of the Pratt Consolidated Coal Co., at Banner, Jefferson County, went on strike recently and refused to come out of the mines, holding four free white men as hostages. After holding out for 30 hr. the men were induced to return to the surface on assurance that their complaints would be heard by the convict board and given due consideration. The convicts alleged unfair treatment at the hands of the warden and prison physician and registered other minor complaints, which will be thoroughly investigated by the board.

After having been idle since July 6, 1916, on which date it was flooded through some old workings with slight covering, Palos No. 3 mine of the Republic Iron and Steel Co. resumed operations recently and the production will be brought up to normal capacity as rapidly as possible. Pumps have been working continuously since the mine was drowned out and the task of dewatering the workings has just been completed. Risco slope, a new opening, is being developed and a number of modern dwellings for employees of the company have recently been completed.

KENTUCKY

Frankfort—For the first time in the history of Kentucky River traffic, tows of coal have been brought down as far as Frankfort from the Lee County fields. Completion of the locks in the river has insured a stage which will make transportation by steam reliable hereafter. Coal is being delivered wholesale at 12 and 13c. a bushel from the barges.

Whitesburg—Perry County coal operators are in the Sandlick Creek section near here making leases for coal lands where, it has been announced, a coal development will be started at once. It is planned to develop the J. N. Thompson tract with adjacent boundaries.

Four Mile—The Joe Manning Coal Co., recently incorporated, has organized and secured machinery for development of 500 acres. J. L. Manning is president and manager and G. Culton construction engineer.

Fleming—The car supply for the Fleming-McRoberts-Neon districts has been above the average for the past ten days, the majority of the operators receiving over 50 per cent. of their allotment. A severe snow storm, followed by a cold wave, somewhat crippled the output. Power lines were slightly damaged by the high wind accompanying the storm.

Pineville—An order adjudging the Continental Coal Co. bankrupt has been entered in the Federal Court here. The company was organized in 1910 by the late Earle Martin, of Chattanooga. Since inauguration of bankruptcy proceedings the properties have been operated under lease by the Federal Coal Co., in which similar interests are represented.

Hazard—The Kentucky River Power Co. is rushing work on transmission lines connecting the many different coal mining plants in the coal fields around Hazard. Transmission lines are being extended to Hamden to connect with the Kenmont Coal Co.'s new plant.

It is expected that the output of the Columbus Coal Mining Co.'s new plant in "the Bend" immediately below this city will be doubled within the next 30 days, while increases are planned for the year for the plant at Douglas. This will soon be one of the largest companies operating in the Hazard field.

Lexington—Valuable maps of Kentucky coal fields belonging to the state mining department were damaged recently to the extent of thousands of dollars when a water pipe froze, burst and flooded one end of the mining quarters in the University of Kentucky building. Low gas pressure was the cause of the trouble.

OHIO

Columbus—Representative Waddell, of Belmont County, has introduced a bill in the Ohio legislature separating the Ohio mining department from the jurisdiction of the Ohio industrial commission. According to the bill the chief inspector is to receive $3500 annually and 12 inspectors, each $1800.

INDIANA

Hymera—The Sullivan County, Indiana coal fields, which fell into disfavor several years ago because of a differential of 10c. per ton on Chicago shipments in favor of the Clinton field, has become the scene of frequent investigations lately by those attracted to investments in coal properties. A considerable area of Nos. 4, 5 and 6 veins in this County are undeveloped, and compared with prices of coal rights in other localities, are offered at attractive prices. In the present state of the commercial markets in the West it seems only a question of time until Sullivan County will regain its old standing. In Jackson township of this county an extensive development seems likely. Chicago capitalists have secured leases on about 700 acres of land east of Hymera, and it is reported they will sink a new mine on these holdings this summer. The Jackson Hill Coal and Coke Co. has purchased 78 acres of coal lands south of Hymera, and it is said a new shaft will be developed on this property, which lies adjacent to its old holdings. A well-known law firm in this county is said to have under control nearly 100,000 acres, on which negotiations for sale are under way.

ILLINOIS

Sesser—It is expected that work will be resumed shortly at the mine here of the T. C. Keller Coal Co. The air shaft has been on fire since the first of the year, which has entirely suspended all operations.

Springfield—During the cold spell just past there was a serious coal shortage in Springfield, due to the refusal of the operators to sell local dealers at $2.25 a ton when they could get $3.50 a ton for coal on outside shipments. The Springfield operators have not raised the price to meet that fixed by the outside demand but when they can get cars they naturally give the outside orders the preference. Local dealers have been limited to a certain number of loads a day and even this allowance has been cut when the outside demand was strong. The Lincoln Park Coal Co., which has no railroad connection, is sending its output by wagons to the Chicago & Alton and loading it on cars, to get the high outside price for it.

Hillsboro—A hung jury resulted from the trial of the case of Edward Whitley, of Witt, against the Burnwell Coal Co. in the Circuit Court here. The suit was for damages alleged to have been caused to a residence owned by him by the sinking of the surface, alleged to have been caused by the coal company "robbing" the mine by removing the pillars of coal. A tract several acres in extent sank 2 ft., damaging the houses on it and causing a lake to form in wet weather. The jury stood eight for the plaintiff and four for the defendant. There are several other suits pending against the company. If a judgment is obtained recovery will have to be sought from the stockholders, as the Burnwell corporation has been dissolved. The mine was sold to the Peabody Coal Co., which later sold it to the Chicago & Eastern Illinois R.R.

ARKANSAS

Huntington—Two shot firers were killed, two miners were seriously burned and the mine of the Central Coal and Coke Co. was so badly damaged that at least 90 days will be required for making repairs, by an explosion that occurred in the third mine entry recently. The explosion was followed by a fire that burned for several hours before being got under control. The explosion wrecked the mine tipple and drove one cage up into the shaft where it stuck. It occurred between shifts and the two shot firers who lost their lives had gone into the mine ahead of their shift.

Personals

T. D. Jones, vice-president of the Jones Delano Co., operators of the New Boston colliery, is seriously ill at his home in Hazleton, Penn.

James E. Strong, recently appointed general superintendent of coal mines for the Sloss-Sheffield Steel and Iron Co., has assumed his new duties.

B. W. Wister, for some years Buffalo representative of the Bader Coal Co., of Boston, has resigned and opened a coal office under his own name in the Marine Bank Building.

J. G. **Miller,** traveling freight agent of the Virginian Ry., has resigned to become associated with the Raleigh-Pocahontas Coal Co. in the capacity of representative at Norfolk, Va.

Charles H. Guscott has resigned his position at Hazelton, Penn., to become coal sales agent for Peale, Peacock & Kerr, of New York. His territory in his new position will cover the anthracite region.

George Wolfe, of Winding Gulf, W. Va., and L. M. Dorsey of Beckley, have leased the Beckley seam of coal in a tract of 71 acres, near Daniel, W. Va. Developments will be started at once.

C. W. **Martin, Jr.** recently took charge of the Southern district, for the Goodyear Tire and Rubber Co. with headquarters at Atlanta, Ga., after serving five years as manager of the motor-truck tire dept.

E. F. **Hackett,** former superintendent of the Madne mine, near Huntington, W. Va., has gone to Jenkins, Ky., to prospect a tract of coal land under lease to Frank Enslow, Walter H. Cunningham and others.

W. E. **Brown,** who has had charge of the Piedmont and Georges Creek Coal Co.'s mines near Franklin, W. Va., has been made superintendent of the coal mines of the West Virginia Pulp and Paper Co., near Luke, Md.

A. M. **Gardner,** superintendent of the Pittsburgh and Southwestern mines, who has been ill with typhoid fever since Dec. 1 of last year is improving slowly. It is hoped that he will soon be able to be about and at his usual activities.

Governor Lowden of Illinois has appointed three new state mine inspectors: Evan D. John, of Carbondale for the southern Illinois district, James Taylor, of Peoria, for the La Salle district, and Robert Reavely, of Springfield, for the Danville district.

James W. Dwyer, former banker of Lewisburg, W. Va., will in future devote his time to the development of a 1200-acre tract of land on Piney River. This tract carres the No. 3 bed of Pocahontas coal at about tipple height from the railroad.

Frank K. Day, chief of the engineering department of the Consolidation Coal Co. for the West Virginia division, is now in Petrograd taking care of the affairs of his company. Mr. Day has been in Russia for some time and will remain indefinitely.

Harry F. Butler, for a long time the Buffalo manager of the office of the Pittsburgh Coal Co., but lately in other business, has opened offices in the Prudential Building as the manager of the lately organized Century Coal Co., of Montreal. The business will consist largely in the shipment of bituminous coal from Pennsylvania mines by water from Lake Erie ports to the St. Lawrence.

Dr. W. F. M. Goss, for many years associated with the schools of engineering, Purdue University, and since 1907 dean of the college of engineering of the University of Illinois, has resigned that office, effective Mar. 1, 1917, to assume the presidency of the Railway Car Manufacturers' Association, an office to which he was elected on Feb. 1, subject to his release by the university authorities.

Obituary

John Martin, aged 42, superintendent of the Wheatcroft, Ky., mines, died in a hospital at Evansville, recently as the result of injuries suffered when thrown from a car in the mines.

Industrial News

Carnegie, Penn.—Pittsburgh Coal Co. has awarded a contract to the Roberts & Schaefer Co. for the equipment of a Marcus patent coal tipple.

Mount Hope, W. Va.—The Sunset Mining Co. recently loaded its first car of coal. This mine is in the Sewell seam and ships by way of the Virginian Ry.

New York, N. Y.—The retail plant of Burns Bros. located at 133d St. and the North River was destroyed by fire on Sunday, Feb. 11, causing a loss estimated at about $40,000.

Clarksburg, W. Va.—A deed was recently recorded by which John C. Weaver and others transferred to the Boston Coal Co. 180 acres of coal land in the Union Heights District.

San Francisco, Calif.—The Williams Patent Crusher and Pulverizer Co., of St. Louis, Mo., has taken larger quarters for its Pacific Coast sales office at 67 Second St., San Francisco.

Harriman, Tenn.—The Tennessee Lumber and Coal Co., of Glen Mary, Tenn., has opened general sales offices in the Manufacturers' Bank Building under the direction of Bartlett Hagemeyer.

Bergettstown, Penn.—The Carnegie Coal Co. has awarded a contract to the Roberts & Schaefer Co. for the remodeling of the Atlas tipple, equipping it with double Marcus patent picking-table screens and loading booms.

Ebensburg, Penn.—A deed has been recorded here which transfers the coal in 320 acres in Carroll township from the Indiana Land and Improvement Co. to the Sterling Coal Co. The consideration mentioned in the deed is $1 and other valuable considerations.

New York, N. Y.—General George W. Goethals, recently opened a consulting office in the Wall Street Exchange Building, 42 Exchange Place, New York. He has associated with him experienced specialists and is engaged in a general consulting practice in civil, electrical, mechanical, and hydraulic engineering.

Elkins, W. Va.—The City of Elkins will be the headquarters of the West Virginia Coal and Coke Co., which has been formed and chartered to carry out the reorganization of the properties of the late Senator Henry G. Davis. This company is capitalized at $14,500,000, and over $7000 was paid for issuing the charter.

Youngstown, Ohio—The receivers of the J. V. Thompson coal properties in Greene County, Penn., have petitioned the county court there to permit them to dispose of the properties to the Youngstown Sheet and Tube Co. at $500 an acre. Part of the acreage is said to be covered by an option to interests reported to represent the Bethlehem Steel Co.

New York, N. Y.—The Combustion Engineering Corporation, 11 Broadway, New York City, announces the doubling of the size of its New York offices. This change was made to accommodate the increase in business due to the constantly increasing demand for its Type "E" stoker for bituminous coal, and the Coxe stoker for anthracite coal.

Cleveland, O.—The Jeffrey Manufacturing Co. of Columbus recently opened a new branch office in Cleveland located at 421 Rockefeller Building. The office will be in charge of W. E. Holloway and C. B. Reed. Both of these men have been connected with the Jeffrey Manufacturing Co. for a number of years, and have had long experience in sales and engineering work.

Cleveland, O.—Having faced a coal famine for several weeks the City of Cleveland recently not only confiscated coal but a Pennsylvania locomotive to haul it. Four policemen climbed into the cab, backed by Thomas S. Farrell, director of public utilities, and amid the continued protest of railroad officials the coal was hauled to a point where Cleveland could use it.

St. Louis, Mo.—The retail coal dealers of St. Louis have organized a temporary organization which will be perfected at a general meeting of the retailers to be held in the Annex Hotel on Feb. 20. It is the intention to have a complete coal trade organization with a secretary to look after the interest of the dealers in regard to tariffs, etc., and maintaining a credit office.

Boswell, Penn.—With the closing of a deal by which the Standard Quemahoning Coal Co. acquires a tract of land owned by Herman Thomas, comes the prospect of a lively new mining town along the proposed new branch of the Baltimore & Ohio R.R. The Standard Quemahoning company has a large plant in the vicinity of Boswell, most of its coal being shipped to the Baltimore market.

Frankfort, Ky.—At a recent conference at Jenkins, Ky., J. E. Barton, state forester of Kentucky, and foresters of surrounding states, decided to make a study of the timber supply for mining operations in the southern Appalachians. Mr. Barton had made preparations for such a survey for the Kentucky district and the scope of this work is now extended to cover the district. Mine operators are coöperating.

Fleming, Ky.—The first shipments of coal from the Wheelwright Division of the Elk Horn Coal Corporation's operation, will in all probability be made in the early fall. The Baltimore & Ohio has promised that the line now under construction to serve this operation, will be completed in the late summer. When fully developed, this will be one of the largest of the Elk Horn's developments. At the present time four openings are being driven.

Tamaqua, Penn.—Interstate Commerce Commission agents who arrived at this place on Feb. 8 sent to the shop 12 of the Reading Railway Co.'s locomotives here, taking them from service until repairs are made. More, it is said, are to follow. The Reading's Shamokin division is crowded with coal and other traffic and has been greatly handicapped by the scarcity of motive power. The temporary withdrawal of these engines adds greatly to the congestion.

Birmingham, Ala.—The Louisville & Nashville R.R. has announced a voluntary increase in the price of fuel coal taken from the mines on its lines in this district of 15c. per ton, effective Jan. 1, 1917. The policy of this line is to pay a fixed price for its fuel coal, which it considers equitable, regardless of fluctuations in the market, and its requirements are pro-rated among the mines which it serves, the same price being paid for all coal furnished, regardless of grade.

South Bethlehem, Penn.—All doubt as to the purchaser of the Lehigh Coke Co.'s plant here has been cleared by an official announcement of the Bethlehem Steel Co., which states that that firm has taken over the concern. E. G. Grace, president of the Bethlehem Steel Co., has been elected chairman of the board of the coke company. The property is valued at $15 000,000, much of the original capital having been furnished by German interests, whose holdings are now taken over by the new owners.

Birmingham, Ala.—Practically every railroad in this section is hard pressed to secure an adequate fuel supply and many are supplementing the maximum quotas called for in their contracts by purchasing fuel in the open market. It is calculated that some lines are using from 25 to 30 per cent. above the maximum figured on in placing contracts. The Frisco railroad is furnishing about 75 per cent. car supply, the Louisville & Nashville about 80 per cent. The Southern Ry. is serving its patrons more effectively than for several months past.

Johnstown, Penn.—Johnstown has been selected as headquarters for the bituminous district of the State Insurance Fund, according to an announcement by Albert L. Allen, assistant manager of the state fund. It will be in charge of Malcolm MacDougall, who will have a staff of six or eight men to inspect the bituminous mines of the state, independent of the inspectors of the Department of Mines. It will be the duty of the new inspectors to inspect the mines with regard to safety and from their report the company is given an insurance rating in the State Insurance Fund.

New York, N. Y.—The Kings County Electric Light and Power Co. and the Edison Electric Illuminating Co., combined, of Kings County, has purchased 37 acres of waterfront property near Rossville, Staten Island, which is to be used for the purpose of storing the reserve coal supply. It is proposed to construct a concrete bulkhead wall along the frontage and to install a large capacity overhead traveling crane to handle coal received. The purchase of the property was consumated with a view to eliminate the effect of possible embargoes, delays in shipment, and to take advantage of low prices of coal.

Washington, D. C.—Separation of the large coal and railway properties in West Virginia, heretofore owned by the Coal and Coke Railway Co. and the Davis Colliery Co. was recently announced. The Roaring Creek & Belington R.R., formerly owned by the Davis company and leased to the Coal and Coke Ry., has been acquired by the latter. The West Virginia Coal and Coke Co., of Elkins, a new corporation, will take over the lands and collieries of the Davis company and the Coal and Coke Ry. The readjustment was effected mainly through the estates of the late H. J. Davis, Richard C. Kerens, and Stephen B. Elkins.

Cincinnati, Ohio—Following urgent requests from operators and dealers for relief from the bad transportation conditions, the Chesapeake & Ohio recently announced an embargo on westbound loadings of all freight, including coal, for the specific reason that large accumulations of freight on its lines due to the inability of connections to move business had resulted in a heavy congestion near Cincinnati and other terminals. The measure was expected to advance the movement of coal destined for Cincinnati to some extent. It was estimated by officials of the railroad that 7000 cars of coal were on the line between the mines and Cincinnati.

Columbus, Ohio—Shortage of coal in many of the cities of Ohio has developed such an acute situation that state officials here expect a statewide movement to commandeer and distribute the coal stored in cars in the railway yards if the cold continues. More than 20 points in the state were recently in communication with the Ohio Utilities Commission over the distressing situation brought about by a shortage of fuel. Seizures already have taken place in many cities. Thus far they have been largely for public institutions, and such seizures are expected to be followed by others for public distribution in such communities as are without adequate fuel in time of storm and intense cold.

Geensburg, Penn.—The Pennsylvania Railroad Co. has let to P. McManus of Philadelphia the contract for the construction of a branch line from Delmont, Westmoreland county, to Saltsburg, Indiana County, a distance of nine miles, with the stipulation that the work must be completed within a year. The new line will tap a fertile coal field, including several thousands of acres of mineral acquired by the Cambria Steel Co. some months ago. The tract will be developed at once and will be one of the big ventures of the Cambria company for the next year. The new line will afford a direct route of communication between the Conemaugh division of the Pennsylvania R.R. and the main line at Greensburg.

St. Louis, Mo.—The Illinois Traction System (McKinley line), after four years of effort, has at last obtained a connection with the Terminal Railroad Association in St. Louis and if no interference on the part of the Interstate Commerce Commission is encountered it will hereafter be in a position to deliver coal anywhere on Terminal lines. The connection was made by authority of the Missouri Public Service Commission after the St. Louis Board of Public Service had refused permission. The permission of the Terminal was not obtained. It is expected that the traction company will deliver coal in St. Louis without charging the bridge arbitrary but the company has made no announcement on that point. Many of the most productive mines in Illinois are on the McKinley lines. Large electric locomotives are to be added to the company's equipment for the purpose of hauling coal to St. Louis.

Market Department

GENERAL REVIEW

Heavy consumption, light production and collapse of transportation service reduces anthracite stocks to lowest point since 1902. Bituminous market waiting developments in the International crisis. Acute shortage at most points. Middle Western industries on very narrow margins.

Anthracite—The unusually rigorous weather over last week end, stimulating consumption up to the maximum and at the same time seriously interrupting mine operations and transportation, precipitated the most serious situation of the season in hard-coal circles. The market was in a particularly poor condition to meet the situation, stocks being light in all directions due to the hesitancy of dealers to buy in excess of their immediate requirements because of the approaching end of the season and the ruling high prices. The loss of several hundred thousand tons of production, occasioned by the suspension in mining during the severe temperatures, reduced the available supplies at distributing centers to probably the lowest point since the big strike of 1902. A great many of the public utility plants were running on the very narrowest margins, and the most rigid rules were put in force to care for old customers. In cases where allotments had been previously made on one- and two-ton lot basis, these were reduced to quarter and half-ton lots and dealers in some instances have been making personal investigations of the stocks in customers bins before making any deliveries. The outlying points as usual were the greatest sufferers, some of these centers being practically cut off from the mines entirely for several days.

Bituminous—The trade is continuing to mark time pending developments in the international situation. These will have a very perceptible effect on the future market as is evident already by the complications arising by the Government enforcing its prerogative of prior loading of Navy coal, and also by the tremendous cut in bunker coal and export requirements occasioned by the new submarine campaign. In spite of this restriction in consumption the current market is even stronger due largely to the recent very severe weather. Transportation difficulties became hopelessly tangled during the cold snap, the car supply in some districts averaging around 30%, while the constant shifting of embargoes had a demoralizing effect. At many points there was just enough coal coming in to meet the most urgent demands. The uncertainty in the foreign situation has brought contracting to a standstill. The gradual recession in spot prices has carried these down to about the contract level, from which there is small probability of any further decline except in sympathy with a similiar decline in contract prices.

Ohio Valley—The railroad congestion has reached the worst stage of the season. The roads usually get the mine yards cleaned up over the week end and a good supply of empties on hand Monday, but the opening of the current week found the lines congested with loaded cars and no empties available, while the exceptionally severe weather accentuated the trouble over the first half of the week. At some points where supplies were at a low stage the question of price became a secondary consideration, and many sensational figures were quoted where the buyer could be assured delivery. Conditions in Canada are especially acute, and buyers from that section have been down to the big distributing centers making a desperate effort to get coal forward. Manufacturing plants are frequently running on a hand-to-mouth basis, while some of the big Public Service corporations, as for instance the Detroit Edison Co., have issued warnings that it may become necessary to cut off power.

Middle West—The transportation difficulties and severe weather have precipitated a very acute situation in this section. Railroad embargoes have practically eliminated Eastern coals from this market, the arrivals of these grades being the smallest in the history of the trade, and the railroad officials offer no encouragement for any immediate improvement. Supplies at distributing centers are very low, dealers carrying minimum stocks, because of the advancing season and the ruling high prices. Many manufacturing plants have been forced to suspend, and steam consumers, generally, are willing to take any coal offered irrespective of grade or price. Contracting is progressing slowly; price tendency on new contracts is upward which is tending to make the producing interests more cautious about commitments.

A Year Ago—Anthracite softer in spite of low temperatures. Plentiful supplies of bituminous, but sellers still confident. Interior market less satisfactory. Middle Western situation continues strong as result of floods and severe weather.

Comparative Average Coal Prices

The following table gives the range of mine prices in car lots per gross ton (except where otherwise noted) on 12 representative bituminous coals over the past several weeks and the average price of the whole group for each week:

Boston	Year Ago	Feb. 17	Feb. 10	Feb. 3	Jan. 27	Jan. 20
Clearfields	†$1.70@2.35	$4.85@5.50	$4.60@5.15	$4.50@4.25	$4.75@5.60	$4.75@5.60
Cambrias and Somersets	*1.90@2.60	5.00@5.75	4.85@5.50	4.90@5.50	5.00@6.25	5.00@5.65
Pocah. and New River[1]	2.80@2.90	6.75@7.00	6.50@6.75	6.50@6.75	6.50@7.00	6.50@7.00
Philadelphia						
Georges Creek (Big Vein)	*2.90@3.00	5.50@5.75	5.75@6.00	5.75@6.00	6.00@6.25	6.00@6.50
W. Va. Freeport	*1.65@1.75	4.00@4.50	5.00@5.15	5.00@5.15	5.00@5.25	5.25@5.50
Fairmont Gas mine-run	*1.70@1.80	5.00@5.25	5.25@5.50	5.25@5.50	5.25@5.50	5.25@5.50
Pittsburgh (steam coal)[2]						
Mine-run	1.35@1.45	5.25@5.50	4.95@5.05	4.70@4.80	4.50@4.75	4.25@4.50
¾-in.	1.40@1.50	5.25@5.50	4.95@5.05	4.70@4.80	4.50@4.75	4.25@4.50
Slack	1.30@1.40	5.00@5.25	4.70@4.80	4.40@4.60	4.00@4.00	3.75@4.00
Chicago (Williamson and Franklin Co.)[2]						
Lump	†1.70@1.80	3.50@3.75	3.75@4.00	3.75@4.00	3.75@4.00	3.50@4.00
Mine-run	*1.10@1.15	3.00@3.50	3.00@3.25	3.25@3.50	3.25@3.50	3.00@3.50
Screenings	*1.00@1.05	3.00@3.25	3.00@3.25	3.25@3.50	3.25@3.50	3.00@3.50
Gross average[3]	*$1.71@1.90	$4.67@5.04	$4.70@4.95	$4.66@4.86	$4.64@5.03	$4.54@4.98

[1] F.o.b. Norfolk and Newport News. [2] Per net ton. [3] The highest average price made last year was $4.80@5.33 made on Nov. 25.
* Price lower than the week before. † Price higher than the previous week.

BUSINESS OPINIONS

Iron Age—About thirty blast furnaces of the Steel Corporation are banked and more may follow. The industry cannot push out product against lines of standing loaded cars nor can it get steady inflow of materials if empty cars do not reach sources of supply. The railroad situation is all absorbing. It is developing a pronounced spot market, particularly in pig iron. Prices on most grades of iron have been advanced from 50c. per ton in some markets and $2 on foundry iron in Pittsburgh, where there has been a spread between prompt and future of fully $5. Basic alone has not responded, domestic sales bringing a shading of $30 at valley furnaces, but the general falling off in production is regarded as a check.

Dunn—International possibilities still dominate all markets and cause a waiting policy in many quarters, though confidence remains a conspicuous feature in trade and industrial circles. Financial conditions are intrinsically sound and banking resources unprecedented, but doubts about foreign affairs restrict offerings of money and prompt business interests to defer important engagements for the future. Preparations are in progress to meet any economic contingency and some products have been withdrawn from sale in anticipation of Federal requirements, government demands already being a factor in certain branches. Commercial failures this week are 296, against 325 last week, 333 the preceding week and 408 the corresponding week last year.

Bradstreet—Activity continues to be the keynote of distributive trade and industrial movements, but the severance of our diplomatic relations with Germany tends to produce an undercurrent of conservatism, check negotiations for foreign loans, defer the launching of some new enterprises, advance insurance and freight rates on seaborne tonnage, restrict investment demand, cause a tightening of credits, as well as rates for money, and the withdrawal of some savings deposits by certain aliens; but cancellations of orders previously placed are negligible. In fact, trade in essentials, all things considered, and allowing for evidences of caution, moves along at a smart pace, jobbing as well as wholesale trade being animated by buying on the part of visiting merchants. High prices for provisions, the highest ever known, and for articles to be worn elicit protests, but buying still goes on, wants, rather than sentiment, being dominant, and widespread scarcity of merchandise clearly testifies to the enormous consumptive power of our population.

Dry Goods Economist—The extent to which the producing capacity of many mills may be called upon by the United States Government and the curtailment of exports and imports by indiscriminate submarine activities on Germany's part are factors of supreme importance in the forecasting of merchandise supply and prices. Significant in this connection was the withdrawal this week of their fall lines by large woolen and worsted mills, though this action was quickly reconsidered and announcement made that orders would again be accepted until the Government's requirements became known. It is clear that the supplying of the Government's military and naval needs would curtail the supply and thus raise the prices of cloths.

Marshall Field & Co.—The semiannual Chicago Market Week and Style Revue has been well attended from all sections of the country. Current wholesale distribution of dry goods is running ahead of the corresponding period of a year ago. Road sales for immediate delivery are running about the same as a year ago, while sales for future delivery on fall lines now being shown by our salesmen exceed the volume of last year by considerable margin.

Contract Prices

Boston—Only a very small tonnage of West Virginia coal has been covered in this market and the buyers were held strictly to their previous tonnages. Some Pennsylvania operators are naming prices to regular customers but restricting tonnage offered to from 50 to 60% of the old contract.

Hampton Roads—An option on a large tonnage at $3 f.o.b. mines, has been withdrawn and the general price tendency is undoubtedly upwards. Shippers are not soliciting business.

New York—Negotiations on new contracts are at a stand-still pending developments in the International situation. Bituminous quotations on new contracts continue on the basis of $3 to $3.50. A few small contracts for anthracite buckwheat have been reported.

Pittsburgh—A very sharp tightening in the spot market, due to the severe weather and interruptions to transportation facilities, has made operating interests more reserved over the matter of contracts. Contract prices are now as follows: Steam, $3 to $3.25; ¾-in. gas, $3.25 to $3.50 per net ton at mine Pittsburgh district.

Buffalo—Consumers have come into the market rather strongly in the past week and the minimum on bituminous coal of any description is $3 with a maximum of $3.50. There are rumors that some of the large producing interests have already covered as much of their requirements as they care to and have withdrawn from the market.

St. Louis—Contract prices seem to be increasing as the season advances, the $1.65 figure of two weeks ago having been replaced by a figure of $1.75 to $1.85 for screenings, while mine-run, which was quoted at $1.50 at that time, is now $1.65 to $1.75. Indications are that $2.25 will be the minmum on steam contracts and that domestic sizes will open at between $2 and $2.25. There is a tendency to hold off on dealer contracts. The Peabody Coal Co. has contracted for the entire output of two large mines in Marion County for the year beginning Apr. 1.

Birmingham—A contract has been covered with one of the smaller railroads for 10,000 tons of mine-run coal at $2.50 per short ton at the mine. There are also a number of inquiries for bunker coal in the market and one for a large export tonnage.

Atlantic Seaboard

BOSTON

Much less doing on contract business. Hampton Roads agencies very cautious as to sales. Spot market readily absorbs all coal available. Pennsylvania grades scarce and high. Anthracite deliveries slower than ever.

Bituminous—There is so much apprehension over what the Government may require from the Pocahontas and New River shippers that there is even less disposition now to close contracts. Spot inquiry is broadening noticeably and everybody knows that whatever tonnage may be available will be readily taken up by eager buyers. The quantities required by interests with ships at hand are increasing; where a few weeks ago such purchases were for 300 to 500 tons at a time they are now for 1500 to 2500 tons. In other words, the tonnage available for application to contract business is rapidly diminishing.

Apr. 1 is the date most of the old contracts expire and more than a few buyers who did not cover for next season a month or so ago are now getting "interested" in the market. One of the results is a more lively spot market. However, ships are so scarce that the Virginia terminals never seemed so far away as now, and there is no one competent to tell what the near future will bring forth.

Marine transportation has moved very slowly the past fortnight, and receipts here are correspondingly light. For inland delivery higher prices are already being quoted either for prompt shipment or in 30 to 60 days. To add to complications at the loading piers the Government is beginning to enforce its privilege of prior loading for ships either belonging to the Government or chartered for its use. The fear of even more drastic measures to get prompt coal is what makes shippers so careful about commitments.

The remarkable thing is that so many consumers are either not alive to the situation or feel that prices are so high now that little can be lost by waiting. Quite a number of buyers are turning to the all-rail coals but the outlook there is about as discouraging.

Two or three of the Hampton Roads shippers who were naming on-car prices for delivery inland next season have now withdrawn them and give no hope that they will reopen the subject.

Only a minimum of tonnage on an alongside basis, aside from rehandling plants, has been contracted for and in every case we know about the customer has been held down strictly to the tonnage he bought the previous season.

A few shippers of the Pennsylvania grades are quietly naming contract prices for the twelve months beginning Apr. 1, but in practically every case this is being confined to regular customers, and in most cases only 50 to 60 per cent. of the tonnage bought by consignees a year ago is undertaken. The labor prospect is altogether too uncertain for operators to sell in excess of half their estimated output.

At Philadelphia and New York the amount of coal available for prompt dumping is very uncertain and irregular. The cold spell the first of the week materially stiffened prices and most grades are up 50c. or more from a week ago. Several of the regular shippers have announced they have no more coal for sale and that their output is so restricted that present obligations will take all the coal they are likely to get.

Bituminous at wholesale is quoted about as follows, f.o.b. loading ports at points designated, per gross ton:

	Clearfields	Camb. and Somerset
Philadelphia	$6.00@6.75	$6.25@7.00
New York	6.25@7.00	6.50@7.25
Tidewater mines	4.85@5.50	5.00@5.75
Alongside Boston (water coal)	8.35@8.75	8.50@9.00

Pocahontas and New River are quoted at $6.75@7 f.o.b. Norfolk and Newport News, Va., for spot coal, and $10@11 on cars Boston and Providence for inland delivery. On contract Apr. 1 to Apr. 1 no prices are quoted.

Anthracite—Slow movement to Tidewater, slow shipping, besides the light mining and much pressure for needs in the big cities and along the line are among the reasons for the great dearth of shipments the past fortnight. The outlook for New England dealers is most discouraging. "Independent" coal is offering, but barges are harder and harder to get, and prices advance accordingly. Boston retailers keep prices on the $9.50 level, though coal in the open market costs well up to that figure. Shipments all-rail from certain of the anthracite roads are embargoed from New Haven R.R. points and this causes added anxiety.

NEW YORK

Anthracite scarce and prices firm. Less coal at Tidewater than at any time this season. Sharp advance in individual prices. Good demand for soft coal. Bunker supplies low and sailings delayed. Loading at piers slow.

Anthracite—There is less coal at the New York Tidewater than at any time this season. Consumption is heavy and as most dealers have been carrying small stocks there has been an increased demand with no coal to meet it. A sharp advance occurred in quotations for individual coals; with the active demand shippers are in a position to almost name their own prices. Buyers, however, are going to be cautious about loading up with high-priced coals now that the coal year is drawing to a close. Loading at the piers was slow the first part of the week due to the storms and the failure of the railroads to get the coal forward.

The steam coals are scarcer and users of pea and buckwheat No. 1 are in many instances substituting chestnut, which can be purchased for nearly the same price as pea. Others are using a mixture of bituminous and either rice or barley, or bituminous entirely. Demand for all three buckwheat coals is steadily increasing while the supply is growing smaller. The practically discarded boiler coal is also now finding a ready market.

Contracting for the buckwheats has practically stopped, producers withholding prices or taking a long time before replying to inquiries. A few small contracts were reported as having been closed.

Current quotations, per gross ton, f.o.b. Tidewater, at the lower ports are as follows:

	Circular	Individual
Broken	$4.95	
Egg	5.45	$8.25@8.50
Stove	5.70	8.25@8.50
Nut	5.75	8.25@8.50
Pea	4.00	7.25@7.50
Buck	2.75	6.25@6.50
Rice	2.20	4.50@5.00
Barley	1.95	3.50@3.75
Boiler	2.20	3.25@3.50

Quotations at the upper ports are generally 5c. higher on account of the difference in water freight rates.

Bituminous—The belief that international developments which practically stopped all vessels leaving this port, would result in larger supplies at the New York Tidewater has so far failed. Supplies are apparently shorter and the few vessels sailing recently have generally been delayed by lack of fuel. Receipts from the mines are slow due to the storms and freight congestions, while loading at the piers frequently takes from ten days to two weeks and sometimes longer when the coal is in transit.

There has been a rebound in prices, and free coals are again bringing good figures. The railroads are buying heavily and there is a good call from waterfront points along the Sound.

Contract coals are moving freely and line trade is active in the sections not under embargoes. Gas coals are in good supply and buyers are using a little more discrimination with the result that the cheaper grades are a trifle more plentiful. Nearly all of the local piers are under embargo orders.

The contract situation is quiet and there has been no change in the quotations of from $3 to $3.50 at the mines for the best grades of bituminous. Producers are awaiting developments as the result of the international situation and buyers are holding back.

Current quotations, per gross ton, f.o.b. Tidewater, for various grades are as follows:

	Port Reading	South Amboy	Mine Price
George Crk. Big Vein	$7.00@7.25	$7.00@7.25	$5.25@5.50
Tyson	6.50@6.75	6.50@6.75	4.75@5.00
Clearfield	6.00@6.50	6.00@6.50	4.50@4.75
South Frk	6.50@6.75	6.50@6.75	5.00@5.25
Nanty Glo	6.50@6.75	6.50@6.75	5.00@5.25
Som'r. Co	6.00@6.50	6.00@6.50	4.50@4.75
Que'ho'ing	6.50@6.75	6.50@6.75	4.75@5.00
W. V. Fa'rm't			
Th'r'qua	6.25@6.50	6.25@6.50	4.00@4.25
Mine-run	6.25@6.50	6.25@6.50	3.75@4.00
West. Md.	6.00@6.50	6.00@6.50	4.25@4.50

PHILADELPHIA

Anthracite shortage becomes serious with specially urgent demand for pea. Premium sales light. New steam prices received quietly. Bituminous prices decline but demand still strong. Market adjusting itself to the new contract figures.

Anthracite—A continuation of the recent severe weather would have created a desperate situation. Because of the nearness of this city to the mining region it has been felt that there would not be any serious difficulty to secure fuel but with zero weather prevailing in the regions the collieries were entirely idle for several days and the market was in no condition to withstand the shortage. City utility plants have been running on an extremely close margin and while there has been coal in transit for them the extremely poor movement has caused much anxiety. One very large hospital was within 45 minutes of being entirely out of fuel, when the situation was relieved by calling on outside interests for help.

The loss of a few hundred thousand tons at a season such as this, together with a sudden abnormal demand, reduced the stocks in the dealers' yards to the lowest ebb since 1902. Many of the smaller dealers are out of all sizes and at a conservative estimate, there is not a dealer in Philadelphia who has a week's supply on hand.

The battle for pea coal is on in earnest. A year ago one of the larger companies shipping into this territory had 140,000 tons of pea coal in storage while another had 90,000 tons and the largest company probably had as much as these two combined. This year their yards are bare of this size. One of the individuals this week offered pea coal to a few select buyers in small lots at $3.25, or 45c. above circular, but this is considered a bargain by those who are willing to pay premium prices. The fact remains, though, that even with the yards absolutely bare of this size the dealers as a rule will not purchase premium coal. The demand for this popular family size is always very heavy during February and March, and there is no hope of satisfying it this year, particularly as so much of it is being used for manufacturing purposes.

The prices to outside markets advanced over last week's quotations, egg, stove and chestnut bringing from $6 to $6.25. The heavy storm and cold wave upset the entire market and all sizes are so eagerly sought for that it is difficult to exaggerate the situation.

Broken is out of the market; none of it is being shipped except on contracts. When the new contract rates are announced Apr. 1, we anticipate an advance of at least 45c. on this size, making the price to manufacturers $4.25 at the mines. One of the big companies is now shipping a little steamboat as a substitute for broken and billing it at $5 at the mines, while for months past a big tonnage of egg has been taken by the same interest, which accounts in part for much of the boom in that size.

Egg, stove and nut are so short that the dealers are asking for any size that can be had. The public is also less inclined to be particular, especially since the newspapers are devoting considerable space to the shortage of fuel.

While the new quotations on steam coal show a considerable advance of the contract prices which expire on Apr. 1 next, the greater proportion of steam coal is now being sold at the old prices, as for instance, $1.50 for buckwheat, and we have heard of a few cases where the circular price of $1.65 is being protected to favored dealers. However, the new figures are the only possible price at which any one not so protected can expect to procure steam coal.

The railroad movement has been particularly poor due largely to a lack of motive power. Agents of the Interstate Commerce Commission condemned in one day 17 engines in service in the local yards of one of the railroad companies and it is also understood that quite a number of locomotives in the mining divisions of the same road were ordered out of service.

There seems to be an increased activity in contracting. It is known that the smaller shippers have closed quite a little business to date from Apr. 1. It is felt that this has had the tendency of interesting the trade generally and that the larger companies will soon announce figures. As a matter of fact it is rumored that the latter have actually closed some business.

The prices per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$4.25	$5.40	Buck	$2.50	$3.40
Egg	4.15	5.25	Rice	2.10	3.00
Stove	4.10	5.60	Boiler	1.95	3.15
Nut	4.50	5.55	Barley	1.85	2.05
Pea	2.80	3.70			

Bituminous—The demand for bituminous does not seem to have slackened in the least. Supplies on hand are far below normal and the inquiries for spot shipments are particularly strong. Yet despite these conditions prices continue to ease off and this week the changes amounted to as much as 75c. to $1 on some grades, while other grades receded from 25c. to 50c. Not much further recessions are expected and the gradual decline of the past few weeks is attributed to the fact that the trade has become satisfied that the contract price of $3.50 will without doubt cover most of the best grades that are placed under agreement for shipment for the year beginning Apr. 1, and the result of this has been for the spot market to approximate somewhat the contract price.

Shipments into the city have not been particularly heavy recently, as the rail movement has been exceedingly poor and the car supply is also at a low ebb. Many of the biggest shippers are still confronted with labor difficulties while the recent severe weather has greatly hampered anything near a normal production.

The prices per gross ton f.o.b. cars at mines are as follows:

Georges Creek Big Vein	$5.50@5.75
South Fork Miller Vein	5.25@5.50
Clearfield (ordinary)	4.50@5.00
Somerset (ordinary)	4.50@5.00
West Va. Freeport	4.00@4.50
Fairmont gas, lump	5.25@5.50
Fairmont gas, mine-run	5.00@5.25
Fairmont gas, slack	4.50@4.75
Fairmont lump, ordinary	4.50@5.00
Fairmont mine-run	4.25@4.50
Fairmont slack	4.50@4.75

BALTIMORE

The coldest spell of the winter has created the most acute anthracite scarcity of the season. Bituminous tonnage restricted by poor car supply, and prices are again moving upward. Exports cut off.

Anthracite—A shortage of hard coal of serious proportions has developed due to the longest and most severe cold snap of the season, reducing deliveries and cleaning up yard supplies to an alarming extent. Deliveries to customers were cut down to actual needs and in some cases dealers even made an investigation of stocks in cellars before delivering.

Bituminous—The soft coal market has stiffened considerably under a heavy demand and poor deliveries, car supply during the past week not running more than 30 per cent. most of the time. The constant shifting of embargoes has more or less demoralized the trade, and it has been very difficult to keep track of reconsignments. A heavy call for gas coals westward advanced prices on these grades. Locally there was just about enough coal coming in to meet urgent calls. The harbor and river was largely ice-bound and a big cut in bunker requirements eased the tense situation to some degree.

Prices at tide are about on an average with mine offerings. Prices at the mines to the trade are about as follows: Georges Creek Tyson, $5; Quemahoning, $4.75; South Fork, $4.50 to $4.75; Somerset, $4.50; Clearfield, $4 to $4.50; Freeport, $3.75 to $4.25; Fairmont gas, three-quarter, $4.25 to $4.50; same, run-of-mine and slack, $4.

Exports—There was not a single vessel clearing here for a foreign port this week. The Custom House announced that the January tonnage on foreign account from Baltimore ran to 53,093. Official figures for the year 1916, were also announced, the movement from this port for the twelve months having totaled 875,166 tons.

HAMPTON ROADS

Shipments principally on contract. Spot market firm. Advance expected over recent contract quotations. Light shipments due to weather conditions.

The coastwise and foreign movement for the past week has been principally on contract, with an occasional spot cargo. Current prices are firmer than a week ago with a strong tone to the market. It is reported that the price of $3 per net ton f.o.b. mines named recently on a large contract effective April 1, has been withdrawn which would seem to indicate an advance of prices on contracts. Shippers are not soliciting contracts and there is a feeling that better prices can be obtained at the market throughout the year.

The Navy Department is displaying the expected activity in regard to requirements, having chartered a number of vessels to supplement the tonnage carried in Naval Colliers. Prices at foreign ports are still high, the Master of the Danish steamer "Nordkap" having paid $42 per ton for 100 tons of coal at Savona, Italy.

Current prices are as follows, for Pocahontas and New River run-of-mine: For cargo shipment, both coastwise and foreign, $7 per gross ton; bunkers $7.50 per gross ton plus 15c. for trimming; local delivery on track $7 per net ton in carload lots. Anthracite $9 per net ton delivered.

Dumpings at the Hampton Roads piers for the past several weeks were as follows:

	Jan. 20	Jan. 27	Feb. 3	Feb. 10
Nor. & West...	137,103	138,413	84,162	106,980
Ches. & Ohio...	103,335	81,835	103,279	44,328
Virginian.....	85,661	111,799	77,154	58,083
Total.....	326,099	332,047	264,595	209,391

PANAMA CANAL

Only one coal cargo passed through the canal during the week ended Jan. 26. This was the "Kish" from Norfolk to Antofagasta with 6,878 tons.

Ocean Shipping

OCEAN CHARTERS

Coal charters have been reported as follows during the past week:

BALTIMORE

Vessel	Destination	Tons	Rate
Heldas	River Plate	1,789	$19.00
W. N. Zwicker	Brazil	398	
Edward Sewall	River Plate	2,916	20.00

PHILADELPHIA

Karep	Santiago de Cuba	1,072	

ATLANTIC RANGE

Edward Sewall[1]	River Plata	2,916	$20.00
Heldos[1]	River Plata		19.00

NEW YORK

Alfina[2]	Barcelona	229	

[1] Feb.-Mar. [2] Ex-Georgetta Lawrence.

OCEAN FREIGHTS

Freight market conditions are practically the same as a week ago, and during this period a few steamers were chartered for export coal, on following terms: $19 net Range to Rio, option Santos at $20 net, March loading; $7.50, Virginia to Kingston, February or March loading, and $4.50 Range to Havana, February or March loading.

We would quote freight rates on coal by steamer as follows:

	Feb. 5	Feb. 13
Europe		
West Coast Italy....	$52.80 about	$54.00@60.00
Marseilles.....	51.60 about	52.80@57.60
Barcelona*[2].....	25.20@26.40	25.20@27.60
South America		
Montevideo.....	22.80@24.00	22.80@24.00
Buenos Aires.....	22.80@24.00	22.80@24.00
Rosario.....	24.00@26.40	25.20@27.60
Rio Janeiro.....	[3]19.00 about	[3]19.00 about
Santos.....	[3]20.00 about	[3]20.00 about
Chile (good port)....	13.00@14.00	13.00@16.00
West Indies		
Havana.....	4.50 about	4.50 about
Cardenas, Sagua....	6.50 about	6.50 about
Cienfuegos.....	6.75 about	6.50@6.75
Port au Spain.....	10.00 about	10.00 about
St. Lucia.....	10.00 about	10.00 about
St. Thomas.....	8.00@8.50	8.00@9.00
Barbados.....	10.00 about	10.00 about
Kingston.....	7.00@7.50	7.50 about
Curacao[1].....	8.00@8.50	8.00@8.50
Santiago.....	6.75 about	6.75 about
Guantanamo.....	6.75 about	6.75 about
Bermuda.....	6.00 about	7.00 about
Mexico		
Vera Cruz.....	8.50@9.00	8.50@9.00
Tampico.....	8.50@9.00	8.50@9.00

* Spanish dues for account of cargo. [1] And p.c.
[2] Or other good Spanish port. [3] Net.

Note—Charters for Italy, France and Spain read: "Lay days to commence on steamer's arrival at or off port of discharge."

W. W. Battie & Co.'s Coal Trade Freight Report.

COASTWISE FREIGHTS

As high as $3.50 has been asked lately on a 2500-ton barge, Hampton Roads to Boston. Bottoms are scarce and none of the interests with steamers in hand are releasing them for the open market. Rates on Long Island Sound for New York loading continue at around a dollar flat, with shippers still very cautious about accepting boats.

VESSEL CLEARANCES

The following vessels have cleared with coal cargoes during the past week:

NORFOLK

Vessel	Destination	Tons
Wagama[1]	Rio Grande do Sul	6,385
Dictator[2]	Manzanillo, Cuba	1,071
Ulysses[1, 6]	Cristobal, C. Z.	12,024
Achilles[1, 6]	Cristobal, C. Z.	11,997
Skinfaxe[7]	Havana, Cuba	1,763
Erik II[8]	St. Lucia, B. W. I.	2,596
J. L. Mowinckel[5]	Puerto Padre, Cuba	2,009
Hubert[9]	Manaos, Brazil	891

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Harald[2]	Havana, Cuba	4,706
Veratyr[2]	Antilla, Cuba	2,145
Bayamo[2]	Havana, Cuba	3,064
Munorway[2]	Havana, Cuba	5,829
Harriet[2]	Cienfuegos, Cuba	2,045
Panama Transport[2]	Felton, Cuba	7,100
Hermod[2]	Havana, Cuba	4,625

PHILADELPHIA

Karen[2]	Santiago
Munalbro	Havana
Durly Chine	Halifax, N. S.
Sheba	St. John, N. B.

[1] Pocahontas Fuel Co. [2] Berwind-White Co.
[3] Castner Curran & Bullit. [4] Baker-Whiteley Co.
[5] Smokeless Fuel Co. [6] Crozer Pocahontas Co.
[7] West Virginia Coal Co. [8] C. & O. Coal Agency Co. [9] C. & O. Coal & Coke Co.

Ohio Valley

PITTSBURGH

More zero weather. Traffic conditions much worse. Some mines blocked by loaded cars. Spot prices higher. Contracting still less active.

Traffic conditions have grown still worse. Late last week the weather moderated somewhat but no improvement occurred with the railroads and this week opened with zero temperatures again. Monday morning saw an unprecedented condition, some mines being blocked with loaded cars; sometimes that occurs toward the close of a week but on Monday all loaded coal is supposed to be removed, and a good supply of empties is expected besides. With the mines it is now a case of operations being impeded as much by slow removal of loaded cars as by shortage of empties. It is estimated that last week's car supplies in this district were between one-third and one-half the requirements, on an average, and this week opens in such a way as to promise still poorer supplies.

There is hardly any prompt coal offered and such as is available brings still higher prices than were quoted a week ago, say an advance of 25@50c. in the week.

Contracting for coal for the twelvemonth beginning Apr. 1 is proceeding still more slowly. It is represented that there is more interest shown on the part of buyers, while sellers have become more reserved, as the increase in the railroad blockade makes it still more uncertain how much coal can be moved after Apr. 1.

We quote the market largely nominal as to both spot and contract: Spot, slack, $5@5.25; mine-run, steam, $5.25@5.50; ¾-in. gas, $5.75@6; contract, steam, $3@3.25; ¾-in. gas, $3.25@3.50, per net ton at mine, Pittsburgh district.

BUFFALO

Traffic held up by weather conditions and coal trains scarcely move. Fear that all communication with the mines may close.

Bituminous—The traffic is nearly at a standstill from the cold and the snow. Some days ago the supply began to run down and prices, which had been somewhat weak, at once stiffened, and are now as strong as they have been at any time since the advance set in. Many sensational prices are reported in the city and the districts outside are so bare of coal that they are prepared to pay almost anything for a supply.

It is no longer a question of price. This section is confronted by the worst weather condition it has perhaps ever known. All the side railroads are closed and it is hard to move trains anywhere. The result is that the congestion is at its worst. Embargoes come in from all roads almost equally numerously and there is no relief in sight.

Till these conditions are abated the coal trade will be a mere matter of getting any fuel at any price, shippers are turning over anything they have, anthracite or bituminous, without regard to size or quality, provided there is any prospect of getting it to destination. Quotations are practically worthless, as they will not mean anything in particular till these conditions are abated. Nothing like them has ever been experienced here. Nominal prices are:

Youghiogheny Gas.....	$6.00@6.50
Pittsburgh Steam.....	5.75@6.25
Ohio No. 8.....	5.75@6.25
Allegheny Valley.....	5.50@6.00
Pennsylvania Smokeless.....	5.35@5.85
Cambria Co. Smithing.....	5.40@5.90
All Slack.....	5.60@6.10
Cannel	5.90@6.40

The contract situation has changed materially. Consumers who had refused to come within 50c. of the demands of shippers are now becoming afraid that they are not likely to get a supply at all unless they contract for at least a part of their requirements; as a result they have gone into the market, paying for the most part more than $3 for anything in bituminous and sometimes as high as $3.50. It is reported unofficially that such big concerns as the Rochester & Pittsburgh C. & I. Co. have contracted as much of their output as they felt safe to cover and have drawn out of the market.

Anthracite—This city is on the verge of a panic on account of the almost total giving out of the supply. For several days at the opening of the week the trains from the mines were practically cut off and zero weather made it hard to operate any trains. Snow drifts also hold up the deliveries to houses in case there is any at the trestles. If independent shippers can make deliveries they can get $2 premium for it, but as a rule they have little or none. Leading dealers refuse to deliver more than a ton or two to a house. Canadians, sometimes the city or town officials in a body come here for coal all the way from Montreal or Winnipeg. Not in many years has the winter been so severe.

TORONTO, CAN.

Coal supply still very short. Large consumers dependent on hand-to-mouth deliveries. Manufacturing plants using anthracite. Cold stormy weather impedes deliveries.

The scarcity of all kinds of coal continues to present a serious problem especially to manufacturers and large public institutions, many of which are dependent on small quantities supplied from day to day. In order to maintain the supply, the Grand Trunk Railway has put an embargo on freights from the West for points east of Toronto with the exception of coal, coke, livestock and perishable goods and has cancelled more passenger trains. In spite of all endeavors to improve the service, railroad deliveries have been much interfered with by the bitterly cold and stormy weather.

Coal dealers claim they can handle the situation and supply immediate requirements, if consumers will be satisfied with small deliveries and not attempt to stock up. Many manufacturing plants are using anthracite mixed with wood or soft coal.

The situation is worse than at any time since the beginning of the shortage; the principal difficulty being in making local deliveries. Owing to severe weather the rush of orders has latterly been so great that many dealers have closed their offices and refuse to accept further orders until those on hand have been filled.

DETROIT

Detroit Edison Co. warns industrial plants power may be cut off. Detroit United Ry. near point of discontinuing heating street cars.

Bituminous—With considerable quantities of coal consigned to Detroit reported as having left the mines, receipts continue light. The embargo by Detroit roads against freight other than coal and food supplies coming by way of Toledo appears not to have effected any substantial increase in the amount of coal reaching Detroit and there is no noticeable increase in the quantity of free coal. The Detroit Edison Co. with more than 900 cars on tracks bound for Detroit, has only three days supply. Consumers of light and power are being warned by advertisements in the daily papers, to cut down on their use of electric current. Announcement is made by the company that unless renewed supply arrives, it will be necessary to discontinue its service to Detroit manufacturing plants within two or three days.

The Detroit United Railway announces that its inability to obtain delivery of anthracite coal held in Buffalo by railroad congestion, will force discontinuance of heat in the company's cars in a few days.

Users of steam coal are making active inquiries for stock which is difficult to get. Jobbers are quoting $5.50 at the mines for any kind of bituminous coal. Temperatures near zero, the last two days of last week and several days this week, resulted in an urgent and large demand for domestic coal which found practically all dealers unable to supply. While definite information concerning new contracts is not to be had, there is a report that a large consumer who sought to close was asked to pay on the basis of $3 at the mines. A local transportation company has been unable to contract for its 1917 coal requirements and has effected an arrangement by which coal is to be supplied to it at whatever may be the lowest market price at the time of each purchase.

Anthracite—Only small amounts of anthracite are getting through the congested tracks in the east and daily receipts are far short of the market's requirements.

Lake Trade—Shippers are still in the market for vessel tonnage but no further contracts have been reported.

COLUMBUS

High prices and scarcity of stocks the chief features of the trade. Railroad congestion increases and embargoes are the rule.

With demand for all varieties ruling strong and railroads unable to take care of the business, the coal trade is in a peculiar situation. Consumers are clamoring for stocks and are willing to pay almost any price within reason. Railroads are so congested that they can not move cargoes in many directions and embargoes have been announced at many junction points.

Retail trade is in a precarious condition in many localities. Dealers' stocks are very low and efforts to replenish them have been unavailing. Some of the city officials are contemplating the confiscation of cargoes when found on sidings within their limits. Retail prices are strong at the levels which have prevailed for some time with every change towards higher figures. Householders are placing heavy orders, and dealers are compelled to apportion their stocks among many customers.

Large steam consumers have little surplus stocks and are operating from a day to day supply. In some instances public institutions have resorted to seizure of loaded cars to keep their institutions heated. Public service concerns have little surplus ahead. In fact the situation is acute and a fuel famine is predicted in many places. Steam prices are firm and range at about the same levels as domestic sizes.

The car shortage, lack of motive power and congestion at terminals are causing a marked curtailment of production which is at a low ebb compared with former weeks.

Prices on short tons f.o.b. mines are as follows:

	Hocking	Pomeroy	Eastern Ohio
Unscreened lump	$4.75	$5.00	.....
Lump and a quarter	4.75	5.00	$5.00
Three-quarter inch	4.75	5.00	5.00
Nut	4.75	5.00	4.75
Egg	4.75	4.75	.....
Mine run	4.75	4.75	4.75
Nut, pea and slack	4.50	4.75	4.75
Coarse slack	4.50	4.75	4.75

CINCINNATI

More cold weather again stimulates the market. Car situation has not improved. Embargoes have prevented a local shortage, but the market is very strong.

Continued severe cold weather, after a day or so of moderate temperature served to keep the domestic demand at its height, while nothing was needed to improve the urgent call for coal from large industrial consumers. The car situation is as bad as ever, which means that the mines are unable to secure more than a small fraction of their car requirements. The embargo declared by the C. & O. on coal and other shipments for the West helped the situation locally, as quantities of coal destined for other points was available for this market. The L. & N. has similar measures in effect, and there is no longer any apparent danger of a shortage in this vicinity.

The transportation situation is the worst in the history of the trade, however, and coal is moving very slowly from the mines. Prices are strong at a very high level, with a pronounced rising tendency.

LOUISVILLE

Urgent demand for coal keeps the market strong. Gas supply shortage produces panicky domestic demand. Car situation without much improvement.

A hand-to-mouth condition continues in the Kentucky coal market especially as to domestic sizes which were greatly stimulated during the past week by the return of severe weather. Curtailment of the supply of natural gas has also created an extra demand for coal which has forced prices up. The steam demand continues strong and seems not to have been affected in the least by the threat of foreign complications. The car supply is unsatisfactory while stormy weather has increased the difficulties of operating.

Few contracts run out at this period and there continues to be a disposition on both sides to await such a settlement of marketing and operating conditions as the spring months will bring. There are reports as to some contracts having been closed.

Prices have increased where quotations are given. One large southeastern Kentucky operator reports having declined an extensive order for Kentucky lump at $4.50 f.o.b. the mines. Quotations may be summarized, f.o.b. the mines as follows: Southeastern Kentucky: block, $4.50; mine-run, $3.50; nut and slack, $3.85@4. Western Kentucky: lump, $3; mine-run, $2.50; nut and slack, not quoted; all prices f.o.b. the mines.

BIRMINGHAM

Demand for steam coal heavy and insistent with prices 25 to 50c. higher. Domestic business also stimulated by cold weather. Railroads confiscate fuel. Car situation acute on several lines.

The activity in the coal market the past week has been more marked than at any time since last fall, and the calls for coal have been heavy and insistent, steam prices having stiffened 25 to 50c. per net ton over a week ago. The market is confined almost strictly to spot business, which is so strong and of such volume that operators are not inclined to entertain any contract propositions.

The situation is nearly akin to that which prevailed during October and November of last year. Mine-run steam coal has sold in car lots at $4.50 per net ton mines, while the schedule advanced to $3@3.50 per net ton on the higher grades of mine-run, and a good volume of business was closed at the latter figure. The lower grades were quoted at $2.50 to $3 per net ton. Many inquiries were received from Georgia and South Carolina points which have previously secured their coal from the Tennessee and Kentucky mines, but the product from the latter states is now being shipped north and the Georgia and South Carolina districts are understood to be facing a coal famine.

A contract was closed with one of the smaller railroad lines for 10,000 tons of mine-run coal at $2.50 per net ton mines. Several of the railroads were in the spot market for 100 cars or so to supplement their contract supply, one line making inquiry for 60,000 tons, deliveries to be made as promptly as possible. None of the mines in the district are in position to accept new contracts calling for any large deliveries, even at flattering figures, as they hadn't the free coal to take care of them.

The demand for domestic coal has been considerably stimulated by the steady cold weather and retailers have come into the market for considerable tonnage. Quotations have been advanced on an average of 50c. per ton, prices being about as follows per net ton mines for lump coal: Big Seam, $3@3.50; Carbon Hill, $3.50@4; Cahaha and Black Creek, $4@4.50; Montevallo, $4.25@4.75.

The car supply with several of the lines has been so short recently that mines have been compelled to lose one and two days per week, and shippers have been further annoyed by confiscation, as the railroads are all short on fuel. Labor conditions are also seriously curtailing the production.

Coke

CONNELLSVILLE

Coke shipments less than half of requirements. Many blast furnaces banked. Prices largely nominal.

The prediction in last report that car supplies in the Connellsville coke region would grow still worse has been fully verified. The average supply last week was less than 50 per cent. of requirements and this week promises to be as bad, as it opened with zero temperature and a 40 per cent. car supply on Monday, when normally there is a much better supply than later in the week. Additional blast furnaces were banked last week. The Steel Corporation has at least 20 stacks banked, probably more, and many independent furnaces are banked. Those banked are not trying to get coke, believing that much of the spot coke bought in the open market is simply taken off contract deliveries. The amount of coke moving in the open market, however, is now very small.

The railroad congestion is now so bad that hopes of an early loosening up in the situation are greatly reduced and there are many who doubt whether there will be satisfactory transportation facilities even when spring weather arrives. There are no negotiations on contract coke as both producers and consumers are unwilling to consider the matter. Occasional sales of spot coke are made. We quote prices as follows, largely nominal: Spot furnace, $10; contract, $6@8.50; spot foundry, $11.50; contract, $8@8.50, per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Feb. 3 at 305,028 tons, a decrease of 47,373 tons, and shipments at 304,903 tons, a decrease of 30,414 tons.

Buffalo—Manufacturing establishments are either out of coke or very close to it and are beseeching the railroads to come to their rescue. Unless there is relief soon heavy losses will be incurred by furnaces and foundries going cold. While the nominal price is on the basis of $11.85 for Connellsville foundry, cars of it have been sold here as high as $15 at the ovens, to which a freight charge of $1.85 must be added.

Chicago—The coke situation shows no improvement. No spot shipments have been available during the week, and byproduct producers are devoting themselves to contracts exclusively where car supply will permit.

St. Louis—The coke situation is tightening up on account of the high price of oil and the scarcity of coal. This is creating a demand for coke for water-gas plants throughout the entire West, and the inability to get coal is forcing the gas plants to pay premium prices for spot coke. Gas house coke is out of the market at any price, and byproduct is commencing to fall behind even on contract shipments.

Birmingham—Inquiries for coke in the local market are very brisk and insistent, but bookings are greatly restricted by the short supply. High-grade spot foundry is quoted at $12 per net ton ovens. Contract business is confined almost exclusively to renewals, prices ranging from $7.50 to $10 per net ton ovens, the tonnage involved in the sales, delivery specifications and length of time customers have been on the books of the producers being determining factors in fixing prices. One of the largest producers has closed contracts recently at $7.50 per net ton on renewal business. However, $8 to $10 per ton more nearly represents the contract market. Furnace coke for the open market is extremely scarce and no quotations are given.

Middle Western

GENERAL REVIEW

Severe weather blocks trade. Car shortages aggravated. Prices generally higher.

Severe winter weather accompanied by delayed transportation, and embargoes on Eastern coals have created a severe situation in the West. The tendency recently was towards lower prices, but zero weather and conditions approaching a blizzard at times caused a radical change in conditions. Eastern roads were seriously crippled, and a number of the more important Western carriers were practically out of business. Some of the Indiana and Illinois mines were shut down entirely for three days because of no cars, and working time has been very spasmodic everywhere.

Retail dealers have been willing to pay any price in order to get immediate deliveries and this has tended to advance the market considerably. Many manufacturers were obliged to shut down and all steam consumers have been accepting any grade of coal available irrespective of price.

Indiana operators claim that the efforts of the State Utilities Commission to relieve the situation have not been successful. The State commission is now going to ask the Interstate Commerce Commission to render assistance, stating that the railroads have not followed any specific method in the distribution of equipment. It is said that the output of coal in Indiana would be 25% higher if the operators could obtain equipment.

The situation in the Northwest is serious. The supply of anthracite on the docks is about exhausted, and extreme low temperatures have made deliveries of soft coal almost impossible, with the result that supplies have been exhausted entirely in some instances. All-rail movement from Western mines has been greatly delayed, and unless the weather moderates soon this section will see much suffering from lack of coal. Indications are that future contract prices will be at least 50% higher for engine coal in this section than those prevailing a year ago, particularly on lake coal.

CHICAGO

Market buoyant owing to small receipts. Embargoes on Eastern coals aggravate situation. Western mines idle two-thirds of week owing to poor car supply.

Chicago has been confronted by a very serious coal shortage, and actual suffering was only avoided by extraordinary efforts on the part of railroads. Last week opened with the most severe weather on record, resulting in the railroads being unable to get much tonnage to Chicago. Illinois mines were out of commission on an average of four days. The situation was somewhat relieved towards the end of the week, although the weather still continued very cold.

Williamson and Franklin County coals are very strong, orders received on every grade bringing full circular prices. Running time averaged two days. The car shortage in Saline County was extreme, and the operators could not even fill contract requirements.

A brisk demand has existed for Indiana domestic sizes, and the retailers having previously cut down buying, many of them were extremely short of supplies during the period of very cold weather. Steam users are complaining vigorously that they cannot get enough Indiana coal. All Indiana mines have had very short running time.

On Wednesday the C. & O. and N. & W. railroads placed an embargo on the movement of coal west of Columbus and Cincinnati, which in the face of a tremendous demand for smokeless sizes prevented any further shipments reaching Chicago and adjacent territory. The movement of Eastern coals to this territory is the worst in the history of the trade, and railroad officials are not hopeful for any relief very soon.

No Hocking, splint or Kentucky coals have been arriving, on account of railroad embargoes and car shortages in the Kentucky fields.

Anthracite receipts are small and a number of dealers have found their bins entirely empty. Any hard coal arriving can be sold at most any price asked.

Quotations in the Chicago market are as follows, per net ton f.o.b. cars at mines:

	Springfield	Fulton & Peoria Cos.	Clinton & Sullivan Cos.	Green & Knox Cos.	Carterville
Domestic lump	$3.50@3.75	$3.50@4.00	$3.50@3.75	$3.50@3.75	$3.50@4.00
Steam lump	3.25@3.50	3.50@3.75	3.25@3.50		
Egg	3.50@3.75	3.50@4.00	3.25@3.50	3.50@3.75	3.50@4.00
Nut	3.25@3.50	3.25@3.50	3.25@3.50	3.00@3.50	
Mine-run	3.25@3.50	3.50@3.75	3.25@3.50	3.00@3.50	
Screenings	2.75@3.00	3.00@3.50	2.75@3.00	3.00@3.25	

	Wlmson. & Franklin. Cos.	Saline & Harrisburg	Poca. & W. Va. Smokeless	Penna. Smokeless	Eastern Kentucky
Lump	$3.50@3.75	$3.50@3.75	$5.00@5.25		
Egg	3.50@3.75	3.50@3.75	5.00@5.25		
Nut	3.50@3.75	3.25@3.50			
No. 1 nut	3.50@3.75				
No. 2 nut	3.25@3.50				
No. 3 nut	3.00@3.25				
No. 1 washed	3.50@3.75			No arrivals	No arrivals
No. 2 washed	3.50@3.75				
Mine-run	3.00@3.50	3.25@3.50	5.00		
Screenings	3.00@3.25	3.00@3.25			

Hocking Lump $4.00@4.25. Splint Lump $4.25@4.50

ST. LOUIS

Car shortage and colder weather create an excellent market. Demand for steam sizes exceptionally good. Many mines have abandoned domestic sizes for mine-run.

The market is very active on account of the increased car shortage and severe weather. Steam demand has been remarkably good, and several mines in the Standard district are now making mine-run exclusively. This caused a shortage of domestic sizes and screenings, which has stimulated those markets.

Car shortage conditions in the Standard district this week have been extremely bad; on some roads one day a week was the best loading for commercial coal. In the Williamson-Franklin County field the car supply was slightly better, but the railroads there are taking their maximum tonnage which practically eliminates shipments of commercial coal.

The market is active on all sizes, and current indications are that there will be very little change for the balance of the month. There is considerable uncertainty as to what the operators will do in March, and this has resulted in a large number of buyers curtailing their present purchases, hoping for a lower market. If they all come in for their full requirements in March, the demand will likely affect the market in a way they least expect.

There is a peculiar situation existing here now in regard to contracts. In the Standard district it is generally understood that no contracts will be made previous to Apr. 1. It is almost a certainty that the Standard operators will make limited contracts in and around St. Louis. In the Mt. Olive district this same attitude will likely be taken by the operators.

The stand taken by the Williamson and Franklin operators will largely govern the others and there is an inclination there to avoid dealer contracts everywhere, excepting such steam contracts as may come through the dealer for wagon load delivery.

At the present time the operators are holding off on commitments for the reason that contract prices seem to be advancing. Two weeks ago $1.65 was considered good for screening contracts, but now $1.75 to $1.85 seems to be more like it. Two weeks ago $1.50 for mine-run was thought reasonable, though now $1.65 to $1.75 is the market.

It is not likely that anything under $2.25 will be taken on different sizes for steam contracts. Indications are that the market will open on domestic sizes at between $2 and $2.25 on Apr. 1.

One of the largest coal transactions of the pre-April period was that consummated this week by the Peabody Coal Co., in which it contracted for the output of the mines of the Big Muddy Fuel Co. and the Pittsburgh and Big Muddy Coal Co. at Marion, Illinois.

The prevailing market, which is from 25c. to 50c. a ton below the country market here, is per net ton f.o.b. mines:

	Williamson and Franklin Co.	Mt. Olive and Staunton	Standard
6-in. lump	$3.00@3.25	$3.00@3.25	$3.00@3.25
3x6-in. egg	3.00@3.25	3.00@3.25	2.75@3.00
2x3-in. nut	3.00@3.25	3.00@3.25	2.75@3.00
No. 2 nut	3.00@3.25		
No. 3 nut	3.00@3.25		
No. 4 nut	3.00		
No. 5 nut	2.50		
2-in. screen	2.75@3.00	2.50	2.35@2.50
2-in. lump			2.75@3.00
3-in. lump		3.00	
Steam egg		2.75@3.00	2.75@3.00
Mine run	2.75@3.00	2.50@2.75	2.50@2.75
Washed			
No. 1	3.00@3.25	3.00@3.25	
No. 2	3.00@3.25	3.00@3.25	
No. 3	3.00@3.25		
No. 4	3.00		
No. 5	2.50		

Rate on Williamson & Franklin Co. is 27½c. Rate on other fields is 57½c.

General Statistics

IMPORTS AND EXPORTS

The following is a comparative statement of coal imports and exports of the United States for November, 1915-16, and for the 11 months ended November, 1914-15-16, in long tons:

IMPORTS	November 1915	November 1916	11 Months 1914	11 Months 1915	11 Months 1916
Anthracite, total	22	108	19,335	2,825	5,542
Bituminous, total	135,319	118,104	1,207,281	1,346,214	1,418,138
United Kingdom	600		16,429	17,187	5,118
Canada	126,929	106,294	937,833	1,086,698	1,268,796
Japan	3,500	10,200	55,939	81,519	87,387
Australia	4,490	1,600	194,827	158,023	30,607
Other countries		10	2,253	2,787	26,230
Coke	2,428	1,990	114,862	43,473	47,897
EXPORTS					
Anthracite total	290,699	322,580	3,645,777	3,244,712	3,866,300
Canada	279,092	311,654	3,585,425	3,157,615	3,776,427
Argentina				2,469	1,530
Brazil		285	6	2,415	713
Uruguay				605	
Other countries	11,607	10,641	60,346	81,608	87,630
Bituminous total	1,396,337	1,329,904	13,105,304	15,602,921	17,740,391
Italy	116,244	33,399		2,747,181	1,661,966
Canada	948,978	914,155	8,742,124	7,725,076	11,078,602
Panama	42,549	36,852	251,798	481,004	377,957
Mexico	11,258	13,823	324,536	264,670	185,963
Cuba	87,446	92,375	1,012,092	1,034,423	1,159,768
West Indies	58,216	35,148	524,004	472,761	409,186
Argentina	27,500	60,854	231,943	759,321	879,895
Brazil	25,159	49,735	260,936	609,472	753,245
Uruguay		6,681	76,088	152,094	150,203
Other countries	78,987	86,882	1,681,783	1,356,919	1,083,606
Total coal	1,687,036	1,652,484	16,751,081	18,847,633	21,606,691
Coke	67,468	92,055	544,098	726,526	947,062
Bunker coal	588,290	612,285	6,775,071	6,907,525	7,217,106

Foreign Markets

GREAT BRITAIN

Feb. 1—The coal market is still inactive, and there is a great scarcity of new business. Prices remain nominally at level last quoted.

Best Welsh steam	Nominal
Best seconds	Nominal
Seconds	$7.20@7.44
Best dry coals	6.96@7.20
Best Monmouthshires	6.96@7.20
Seconds	6.24@6.48
Best Cardiff smalls	4.80@5.04
Cargo smalls	4.32@4.56

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport, both net, exclusive of wharfage.

Freights—The freight market has undergone a considerable change; the limitation rates for neutral steamers having been raised 20% to French Atlantic, and 50% to Mediterranean ports. This has had a considerable effect on other ports, Gibraltar for instance jumping from $10.20 to $17.40. Tonnage is still scarce, but it is considered that the new scale will have the desired effect. Limitation ports are marked *.

Gibraltar	$17.40	Port Said	$19.80
Marseilles	*21.06	Las Palmas	9.00
Genoa	*21.42	St. Vincent	13.20
Naples	*20.70	River Plate	13.20
Alexandria	19.80		

Exports—British exports for December and the 12 months of the past two years were as follows:

To	December 1915	December 1916	Twelve Months 1915	Twelve Months 1916
Russia			42,559	4,804
Sweden	171,787	141,320	2,659,995	1,646,502
Norway	185,518	146,559	2,643,187	2,307,753
Denmark	216,165	183,485	3,130,642	2,305,409
Netherl	137,915	124,582	1,792,951	1,346,129
France	1,386,299	1,110,211	17,001,361	17,311,877
Portugal[1]	84,403	29,293	1,022,755	886,972
Spain*	134,627	221,369	1,597,083	2,007,899
Canary	23,419	15,662	470,680	399,865
Italy	382,496	273,571	5,788,460	5,710,098
Greece		9,988	309,198	168,106
Turkey*			10,324	5,987
Algeria	93,011	39,426	939,846	721,803
Portugal[5]	18,070	6,092	210,652	216,691
Chile	119	159	46,407	24,194
Brazil	28,462	9,021	498,340	196,973
Uruguay	32,998	4,636	332,541	179,472
Argentina	163,606	25,278	1,618,603	728,412
Channel Is	14,007	2,324	131,110	115,819
Gibraltar	21,817	36,313	356,075	517,135
Malta	18,740	13,328	151,153	84,784
Egypt[2]	130,738	126,313	1,388,914	893,686
Aden[3]	5,104	6,591	132,475	29,935
India	50	592	24,536	11,400
Ceylon			43,487	25,726
Miscell	37,891	36,130	591,226	504,122
Coke	101,168	96,060	1,010,713	1,481,498
Briquettes	81,826	73,614	1,225,071	1,324,695
Total	3,470,236	2,782,017	45,770,344	41,157,746
Bunker	953,878	1,014,520	13,630,964	12,988,172

[1] Includes Azores and Madeira. [2] Including Anglo-Egyptian Sudan. [3] And dependencies [4] And Canaries. [5] West Africa.

* The figures for 1916 relate to exports to ports or places in territory formerly Turkish, but now occupied by other powers.

Note—The figures in the above table do not include Admiralty and certain other shipments.